Commonwealth of Pennsylvania

DEPARTMENT OF AGRICULTURE

BULLETIN No. 264

Proceedings of the Thirty-Eighth Annual Meeting of the

Pennsylvania State Board of Agriculture

ALSO

PROCEEDINGS OF THE PENNSYLVANIA BREEDER'S ASSOCIATION AND DAIRY UNION

HELD IN THE

BOARD OF TRADE BUILDING, HARRISBURG, PA.
JANUARY 26, 27, and 28, 1915

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
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VIRTUE
LIBERTY AND
INDEPENDENCE

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MEMBERS

OF THE

Pennsylvania State Board of Agriculture

FOR THE YEAR 1915

MEMBERS EX-OFFICIO

HON. MARTIN G. BRUMBAUGH, Governor.
HON. HENRY HOUCK, Secretary of Internal Affairs.
DR. N. C. SCHAEFFER, Superintendent of Public Instruction.
DR. EDWIN ERLE SPARKS, President of the State College.
HON. A. W. POWELL, Auditor General.
HON. N. B. CRITCHFIELD, Secretary of Agriculture.

APPOINTED BY THE GOVERNOR

John H. Stephens, Esq., Johnstown, Cambria County, ...Term expires 1916
Mrs. Jean Kane Foulke, West Chester, Chester County,.....Term expires 1917

APPOINTED BY THE PENNSYLVANIA STATE POULTRY SOCIETY

W. Theo. Wittman, ...Allentown,.....1917

APPOINTED BY THE PENNSYLVANIA BEE-KEEPERS' ASSOCIATION

E. A. Weimer, ...Lebanon, ...1918

ELECTED BY COUNTY AGRICULTURAL SOCIETIES

			Term expires.
Adams, ...	A. I. Weidner, ...	Arendtsvile, ...	1918
Allegheny, ...	C. L. Hood, ...	Coraopolis, R. D., ...	1918
Armstrong, ...	S. S. Blyholder, ...	Kelly Station, ...	1917
Beaver, ...	Walter C. Dunlap, ...	West Bridgewater, ...	1917
Bedford, ...	Wm. F. Biddle, ...	Everett, ...	1918
Berks, ...	H. G. McGowan, ...	Geiger's Mills, ...	1916
Blair, ...	W. Frank Beck, ...	Altoona, ...	1917
Bradford, ...	F. D. Kerrick, ...	Towanda, ...	1916
Bucks, ...	B. Frank Wambold, ...	Sellersville, ...	1917
Butler, ...	Wm. H. Milliron, ...	Euclid, ...	1917
Cambria, ...	L. J. Bearer, ...	Hastings, ...	1916
Cameron, ...	R. P. Heilman, ...	Emporium, ...	1916
Carbon, ...	Edward Lienhard, ...	Mauch Chunk, ...	1917
Centre, ...	John A. Woodward, ...	Howard, ...	1918

			Term expires
Chester,	M. E. Conard,	Westgrove,	1918
Clarion,	J. H. Wilson,	Clarion,	1916
Clearfield,	Harrison Straw,	Clearfield,	1916
Clinton,	Joel A. Herr,	Millhall,	1917
Columbia,	A. P. Young,	Millville,	1916
Crawford,	W. F. Throop,	Espyville,	1918
Cumberland,	Abram Bosler,	Carlisle,	1916
Dauphin,	E. S. Keiper,	Middletown,	1917
Delaware,	Thos. H. Wittkorn,	Media,	1917
Elk,	John M. Wittman,	St. Marys,	1916
Erie,	John J. Rouse,	Wattsburg,	1916
Fayette,	John T. Smith,	Dunbar,	1916
Forest,			
Franklin,	J. P. Young,	Marion,	1917
Fulton,	Frank Ranck,	Hancock, Md,	1916
Greene,	C. E. Lantz,	Carmichaels,	1916
Huntingdon,	George G. Hutchison,	Warrior's Mark,	1918
Indiana,	S. C. George,	West Lebanon,	1916
Jefferson,	Peter B. Cowan,	Brookville,	1916
Juniata,	Matthew Rodgers,	Mexico,	1918
Lackawanna,	Horace Seamans,	Factoryville,	1916
Lancaster,	J. Aldus Herr,	Lancaster,	1917
Lawrence,	Sylvester Shaffer,	New Castle,	1916
Lebanon,	H. C. Snavely,	Cleona,	1916
Lehigh,	P. S. Fenstermacher,	Allentown,	1918
Luzerne,	J. E. Hildebrant,	Dallas,	1918
Lycoming,	A. J. Kahler,	Hughesville,	1918
McKean,	E. A. Studholme,	Smethport,	1916
Mercer,	W. C. Black,	Mercer,	1917
Mifflin,	C. M. Smith.	Lewistown,	1916
Monroe,	F. S. Brong,	Saylorsburg,	1916
Montgomery,	John H. Schultz,	Norristown,	1917
Montour,	J. Miles Derr,	Milton,	1916
Northampton,	C. S. Messinger,	Tatamy,	1918
Northumberland,	I. A. Eschbach,	Milton, R. D.,	1916
Perry,	Clark M. Bower,	Blain,	1916
Philadelphia,	David Rust,	Philadelphia,	1916
Pike,	B. F. Killam,	Paupack,	1918
Potter,			
Schuylkill,	John Shoener,	New Ringgold,	1916
Snyder,			
Somerset,	Robert W. Lohr,	Boswell,	1917
Sullivan,	G. Eugene Bown,	Forksville,	1918
Susquehanna,	Frank A. Davies,	Montrose,	1916
Tioga,	C. H. DeWitt,	Mansfield,	1917
Union,	J. Newton Glover,	Vicksburg,	1917
Venango,	Wm. A. Crawford,	Cooperstown,	1916
Warren,	R. J. Weld,	Sugargrove,	1917
Washington,	Jas. M. Paxton,	Houston,	1917
Wayne,	W. E. Perham,	Varden,	1917
Westmoreland,	W. F. Holtzer,	Greensburg,	1916
Wyoming,	G. A. Benson,	Tunkhannock,	1916
York,	Geo. F. Barnes,	Rossville,	1917

OFFICERS

PRESIDENT

Hon. Martin G. Brumbaugh, ... Harrisburg.

VICE PRESIDENTS

F. D. Kerrick, ... Towanda.
J. P. Young, ... Marion.
C. H. DeWitt, ... Mansfield.

EXECUTIVE COMMITTEE

S. S. Blyholder, ... Kelly Station.
P. S. Fenstermacher, ... Allentown.
W. O. Black, ... Mercer.
G. F. Barnes, ... Rossville.
Hon. H. G. McGowan, ... Geiger's Mills.
C. M. Bower, ... Blain.
Matthew Rodgers, ... Mexico.
John Shoener, ... New Ringgold.
N. B. Critchfield, Secretary, Ex-officio, ... Harrisburg.

ADVISORY COMMITTEE, CONSULTING SPECIALISTS AND STANDING COMMITTEES AS REPORTED BY THE EXECUTIVE COMMITTEE

ADVISORY COMMITTEE

J. H. Schultz, ... Norristown.
Joel A. Herr, ... Millhall.
W. C. Black, ... Mercer.

LEGISLATIVE COMMITTEE

H. G. McGowan, ... Geiger's Mills.
Robert W. Lohr, ... Boswell.
S. S. Blyholder, ... Kelly Station.
P. S. Fenstermacher, ... Allentown.
Matthew Rodgers, ... Mexico.

COMMITTEE ON RESOLUTIONS

J. Aldus Herr, ... Lancaster.
Col. John A. Woodward, ... Howard.
B. F. Killam, ... Paupack.
George G. Hutchison, ... Warrior's Mark.
W. C. Black, ... Mercer.

CONSULTING SPECIALISTS

Botanist,	Prof. F. D. Kern,	State College.
Pomologist,	Chester J. Tyson,	Floradale.
Chemist,	Dr. William Frear,	State College.
Vet. Surgeon,	Dr. C. J. Marshall,	Harrisburg.
Sanitarian,	Dr. S. G. Dixon,	Harrisburg.
Microscopist and Hygienist,	Prof. J. W. Kellogg,	Harrisburg.
Entomologist,	Prof. H. A. Surface,	Harrisburg.
Ornithologist,	Dr. Joseph Kalbfus,	Harrisburg.
Meteorologist,	Prof. W. G. Owens,	Lewisburg.
Apiarist,	H. C. Klinger,	Liverpool.
Economic Geologist,	Prof. Baird Halberstadt,	Pottsville.
Agricultural Geologist,	W. H. Stout,	Pinegrove.
Forests and Forestry,	Irvin C. Williams,	Harrisburg.
Feeding Stuffs,	G. G. Hutchison,	Warrior's Mark.
Soils and Crops,	Prof. Franklin Menges,	York.

STANDING COMMITTEES

CEREALS AND CEREAL CROPS

Edward Leinhard, ... Mauch Chunk.

ROADS AND ROAD LAWS

Col. J. A. Woodward, ... Howard.

FRUIT AND FRUIT CULTURE

E. A. Studholme, ... Smethport.

DAIRY AND DAIRY PRODUCTS

B. Frank Wambold, ... Sellersville.

FERTILIZERS

F. S. Brong, ... Saylorsburg.

WOOL AND TEXTILE FIBERS

S. C. George, ... West Lebanon.

LIVESTOCK

W. F. Throop, ... Espyville.

POULTRY

W. Theo. Wittman, ... Allentown.

Proceedings of the Thirty-Eighth Annual Meeting of the State Board of Agriculture, Held in the Board of Trade Building, Harrisburg, Pa., January 26, 27 and 28, 1915.

The Board met at 9 A. M., January 26, 1915, Vice President, B. F. Killam in the Chair.

The CHAIRMAN: Gentlemen, it affords me much pleasure to announce that our Governor is with us this morning, and he is the President of the State Board of Agriculture, and being present, will act at this meeting as long as he can.

(Governor Brumbaugh took the Chair and was received with applause)

The CHAIRMAN: I understand that by the Act of Assembly establishing this body, I am ex-officio a member, and by the traditions of office, rather than by law, the President of the Association. While I have some reverence for traditions, I have not any pronounced desire, personally, to assume an office merely on the tradition that carries me to it; but, nevertheless, quite apart from all that, the reason that you are here is the reason that brings me here. We are interested in the problem which you have, by law, to solve, and as a part of the group required by law of the Commonwealth to solve that problem, I felt it my duty as well as a privilege to accept the suggestion of the Secretary of Agriculture and come here this morning and be a part of the opening hour of this conference. The first business is the calling of the roll.

The roll of members was then called by the Assistant Secretary, and at this, and subsequent roll-calls, the following members were found to be present:

Governor Martin G. Brumbaugh, Hon. N. B. Critchfield, Secretary of Agriculture, John H. Stephens, Mrs. Jean Kane Foulke, W. Theo. Wittman, E. A. Weimer, of the Pennsylvania Bee-Keepers' Society; W. F. Biddle, S. S. Blyholder, H. G. McGowan, F. D. Kerrick, B. F. Wambold, L. J. Bearer, Edward Lienhard, J. H. Wilson, Harrison Straw, Joel A. Herr, A. P. Young, W. F. Throop, T. H. Wittkorn, John J. Rouse, John T. Smith, J. P. Young, Frank Ranck, S. C. George, Peter B. Cowan, Matthew Rogers, Horace Seamans, J. Aldus Herr, Sylvester Shaffer, A. J. Kahler, E. A. Studholme, W. C. Black, M. M. Naginey, F. S. Brong, J. Miles Derr, C. S. Messinger, I. A. Eschbach, Clark M. Bower, B. F. Killam, John Shoener, G. Eugene Bown, Robert W. Lohr, C. H. DeWitt, J. Newton Glover, R. J. Weld, W. E. Perham, W. F. Holtzer, G. A. Benson, George F. Barnes, P. S. Fenstermacher, Dr. M. E. Conard, James M. Paxton, W. Frank Beck, E. S. Keiper and J. H. Stevens.

The following Consulting Specialists were also in attendance: Prof. F. D. Kern, Botanist; Chester J. Tyson, Pomologist; Dr. William Frear, Chemist; Dr. C. J. Marshall, Veterinarian; Dr. S. G. Dixon, Sanitarian; Prof. J. W. Kellogg, Microscopist and Hygienist; Prof. H. A. Surface, Entomologist; Dr. Joseph Kalbfus, Ornithologist; Prof. W. C. Owens, Meterologist; H. C. Klinger, Apiarist; Baird Halberstadt, Economic Geologist; W. H. Stout, Agricultural Geologist; George G. Hutchison, Feeding Stuffs; Prof. Franklin Menges, Soils; J. D. Herr, Insecticides.

The SECRETARY: There is a quorum present, Mr. Chairman.

The CHAIRMAN: The next item of business is the reading of the minutes of our previous meeting.

Secretary Critchfield then read the minutes of the Spring Meeting of the State Board of Agriculture, held at Stroudsburg, Pa., May, 1914.

The SECRETARY: I would like to say, Mr. Chairman, that the motion included in the motion to adopt the report, that it be printed and circulated, was complied with in the circulation of the proceedings of the meeting at Stroudsburg. There was some objection made upon the part of the Superintendent of Public Printing to publishing any one thing more than twice, and as this item was to appear in the proceedings of that meeting, it was not thought best to raise any question about publishing the report of the committee in pamphlet form. The report was circulated among all the members of the Board.

The CHAIRMAN: You have heard the reading of the minutes; what is your pleasure?

MR. HUTCHISON: I move that they be adopted.

The motion was seconded and carried.

The CHAIRMAN: I find it my duty at this time to appoint a Committee on Credentials. As Chairman of the Committee on Credentials, I will appoint Mr. J. Aldus Herr, and as members with him, Mr. J. H. Wilson, Mr. W. C. Black, Mr. Robert W. Lohr and Mr. J. Newton Glover. I assume the Committee is familiar with its duties and will take up their work at once. The next item on your program is the Report of Standing Committees and Specialists, the first of which, after the Secretary speaks—I see he is troubled with an idea here and I will let him get rid of it now.

The SECRETARY: I want to get it off as quickly as possible. I hold in my hand certain credentials sent to me during the interim. If there are any others who have credentials, please pass them to Mr. Herr and the Committee can meet in this room right here, where you will find paper on which you can make your report.

The CHAIRMAN: The first of these Standing Committee Reports, is the one relating to Cereals and Cereal Crops. That report is to be presented by Mr. J. Newton Glover, of Vicksburg. Now I very much fear we have just sent him out of the room on that Committee,

so we will pass that for a moment. Well, here he is waiting to do his duty. Come right up, Mr. Glover, and go ahead.

Mr. Glover then submitted the following report:

REPORT OF COMMITTEE ON CEREALS AND CEREAL CROPS

By J. NEWTON GLOVER, *Chairman.*

The premature reports of the enormous crops for 1914 failed to materialize as fully as predicted by the authorities at Washington; though crops yields are 9% larger than last year, but nearly 8% under that of 1912. The continued wet weather in the spring delayed oats seedings, and it was followed by hot and dry weather which made spring crops less than first reports promised, yet more favorable weather later helped make a better yield by 2% than the ten year average. Prices for grain started lower than in 1913, but the war in Europe raised the price of wheat from 75 cents to $1.30 in 5 months.

WHEAT

This crop was covered with snow a good part of the winter and looked well in the spring, making a good growth of straw later and filled well, giving an average yield for this State of 17 bushels, while the yield for the United States was 16.7 bushels, against 14.4 bushels as the 10 year average, showing the seasons have been more favorable, or that farmers are producing more per acre. Black rust did much damage in the spring wheat states, lowering the yields there, and the Hessian fly was responsible for some damage in our State. The average price for 1914 was 96.2 cents against 77 cents for 1913 crop, and the estimated yield is 891,950,000 bushels in all. On account of the increase in price due to the war, about one per cent. more acres were needed than ever in this State, but the dry weather in autumn and fear of damage by the Hessian fly, wheat seeding was delayed and the soil not as well prepared for seeding as usual. More acres of corn stalks were seeded to wheat than formerly, since more silos were filled with corn which left ground ready for disking and seeding to wheat on a seed bed favorable for a good wheat crop.

CORN

"Corn is king of crops," and receives more attention than any other crop, because of the many ways it can be used for food for man and beast. The crop was 2,672,804,000 bushels for the country, or an average of 25.8 bushels more per acre than last year, while 63.7 cents was the price on an average. Though our State stands 14th in production of corn, yet the average yield is 39 bushels of shelled corn, which is higher than that of most of the great corn states.

There was much soft corn in some sections of the State on heavy clay soils which had not been plowed in fall or early spring before the dry spell began where there was not enough moisture to germinate seed, and it did not grow till rains came in June. Greater care is being taken in selecting and testing seed corn to get an even stand, as advocated by the agricultural press and institute instructors. There are about 17,000 silos in this State, of which 17% were built last year, and farmers realize that this is one of the best ways to care for this crop for either beef or milk production or for a succulent feed for brood sows and chickens.

OATS

The oats crop of this country was 1,141,060,000, making an average of 29.7 bushels per acre or nearly the same as 1913, while the price was four cents more per bushel. While this crop is not always a profitable one in all section of the State, as so much depends upon the weather when it is filling, yet it fits into a four-year rotation nicely, and the crop can be removed in good time to prepare a good seed bed for wheat, or in some sections, grass follows it well where wheat is not grown largely.

RYE

This State ranks 4th in production of rye, with an average yield of 17 bushels per acre, and it is sold at an average price of 75 cents. The fact that it yields more straw and grain on thin soils than wheat and can be seeded later than wheat, is one reason why so many acres are grown and it makes a good cover crop in corn stalks which otherwise would lie bare. In the production of buckwheat, Pennsylvania ranks first, with an average yield of 18 bushels per acre, or a crop of 5,180,000 bushels. The yield of our State was 3 bushels lower than the average of the United States, due to the hot, dry weather when filling.

HAY

More acres are devoted to grass than any other crop in Pennsylvania which gives us second place in production of hay, or 4,146,000 tons. While the hay crop was not nearly so good as the 1913 crop, on account of dry weather during the growing season, yet the yield for the country was better by nearly one-tenth of a ton per acre and the price $1.30 a ton less. On account of the continued dry weather during summer and autumn, pastures were short, and stock had to be fed dry feed earlier than usual. Very little clover seed was made, as the second growth of clover was short and not well filled. The hay crop having been cut short by dry weather, very little timothy was left for seed as compared with the previous year, though much seed was held over on account of lower prices for the 1913 crop.

POTATOES

In the production of this crop our State stands sixth, with an average yield of only 88 bushels per acre, and they sold for nearly 80 cents per bushel, while the average price for the country was

about 49 cents, and the yield 109½ bushels. Blight and beetles were not so much in evidence the past year as to make spraying so necessary as other years.

On the whole it was a good year for the American farmer, and the war in Europe made better prices possible than otherwise could have been realized, and it is a case of one nation's loss being another's gain. But the American farmer is learning to rotate his crops so as to get a legume or clover crop every few years, instead of following corn after corn or wheat after wheat, as they tried in the spring wheat states till their soils got so full of foul seeds that they had to change their rotation to get in a cultivated one to kill weed seeds.

One of the hopeful and encouraging signs of the times in agriculture is that more students are taking the agriculture courses in college and more business men are buying farms as a business proposition, while the average farmer is trying to grow crops more profitably, not because he wants to have more money to buy more land to grow more corn. But farmers want to make more money to enable them to have in their homes the comforts, cenveniences and pleasures which will make them and their families better contented and happier on the farm, and to some extent stop this exodus of the best blood to town to enjoy some of the advantages there which farmers should try to have in their homes or in their neighborhood by working together as a community along that line for which their soil or section is best adapted.

The CHAIRMAN: You have heard this report as presented by the Chairman, Mr. Glover, and the report is now before you for discussion.

MR. JOEL A. HERR: Mr. Chairman, I would like to make a little innovation on the program just at this time to carry out the wishes of a sort of an impromptu meeting of the Board yesterday, to consider the educational bill passed by Congress last year, known as the Lever Bill. A large number of us gathered together, I guess the majority of the Board were present, and it was suggested that this ought to be taken up in the early part of the meeting, so as to be able to give it due consideration and bring it before the Board of Trustees of State College. A Committee of Five was appointed to consider that bill and report on it the wishes of the State Board of Agriculture concerning that appropriation bill. We had the bill before us and we read it, discussed it, handled it in Committee, and we prepared a short report which I would ask the Secretary of the Committee, Dr. Conard, to present.

The CHAIRMAN: If there is no objection, we will have that report read by Dr. Conard. I hear no objection; the Doctor will please present that report.

Dr. Conard then presented the following Resolution in relation to the Lever Bill:

RESOLUTION RELATING TO LEVER BILL

WHEREAS, At the last session of Congress a bill was passed, commonly known as the Lever Bill, providing for annual appropriations for co-operative agricultural work, making an appropria-

tion of $600,000 for such work for the current year, with provision for increasing said appropriation by the addition of $500,000 each year for seven years, and for each year thereafter $1,100,000 to be divided among agricultural colleges of the several states of the Union in the proportion which the rural population of each state bears to the total rural population of all the states, provided no state shall receive its pro-rata share until an equal sum has been appropriated for that year by the Legislature of such state, or provided by state, county, or undivided contributions from within the state for such Co-operative Extension Work, and

WHEREAS, After the expiration of the first seven years the amount to be appropriated annually by the Legislature of Pennsylvania upon the basis named in said bill will exceed the sum of $250,000, thereby be it

RESOLVED: That we are opposed to the acceptance of the proposition contained in said bill by an appropriation being made by our General Assembly to equal Pennsylvania's share of the said appropriation made for co-operative work by the Congress of the United States, unless the total sum of the Federal and State appropriations for extension work be distributed equally by and through the State Department of Agriculture and the Pennsylvania State College. The act making the State appropriation shall provide that the persons employed for such co-operative work shall be employed by the Department of Agriculture and our State College, and no person shall be employed in said co-operative extension work that has not had at least three years actual experience and practice in farm work.

Signed. J. A. HERR,
C. H. DE WITT,
S. S. BLYHOLDER,
MATTHEW RODGERS,
M. E. CONARD.

DR. CONARD: Mr. Chairman, I move the odoption of the resolution as read.

(Motion seconded).

The CHAIRMAN: The motion is regularly before you and before it is put, let us understand how this report comes to us. As I understand from Mr. Herr, this is purely a service of voluntary interest and by no means an official committee's action. Is that correct? A group of you got together, interested in this, and prepared this report; that is, you had no official designation to bring this report to the body?

MR. JOEL A. HERR: Except that we represented the greater part of the Board.

The CHAIRMAN: How many were present when that was brought in?

MR. JOEL A. HERR: I presume about 25. The idea was not to interfere with the regular work at all, it was simply to get this before the Board at an early stage in this meeting, because it wants to come before the State College Trustees who meet this afternoon.

The CHAIRMAN: Yes. Well, what is your pleasure about it? Do you want to adopt it without discussion or do you want to discuss it?

The SECRETARY: I would substitute for that motion that it be referred to the Committee on Resolutions to be appointed later, then it would come up for regular discussion when we come to consider the report of the Committee on Resolutions.

MR. JOEL A. HERR: I would say that the object of passing it at this time was to get the sense of the Board at this session, in order to report to the meeting of the Trustees of the College and get their views on the matter. Now this Board, created away back in 1877, has always stood firmly at the back of the College. Many of us have served on it; some of us, at least, on this Board of Trustees, for many years. I myself was on the Board 18 years and we are the strongest possible friends of the College. We backed it in every way, financially and otherwise, before the Legislature, during good report and bad report, and we don't want to antagonize it at all, but it does not look right to us that this money should be sent in, and when it comes in in the quantity it will, it will constitute the greater part of the agricultural appropriation of the State, to be placed entirely out of our reach and we not recognized as having any interest in the appropriations for agriculture. It destroys, really, the institute arrangement, takes it out of our hands and puts it in the hands of the State College. Now, I think the State College has as much to take care of as it can, and the more representative we make it, bring it out before the people, as this is a representative body, and the Department of Agriculture wants to be reckoned with in this matter, that is what it is created for, and what is the use of having a Department and having a Board of Agriculture, if the whole matter is to be directed from the State College. We don't doubt the purpose of State College or their wisdom and their ability to handle great questions, but we do not think it is the proper thing to take it out of our reach and the reach, I should say, of the Department of Agriculture, and place it entirely in the hands of the College. That is our objection and we want to do it in the most friendly manner and arrange it on whatever basis we can with the Trustees of the College to have an amicable settlement of the matter.

The CHAIRMAN: Is there any further thought on the subject by anyone?

MR. BRONG: I rise to second the motion.

ADDRESS OF GOVERNOR BRUMBAUGH

I am not, of course, in a position to discuss this as a presiding officer; but if you will allow me that courtesy for a minute, I should like to say a word or two as bearing upon it. My thought would be that any action now either favorable or unfavorable to the report of this Volunteer Committee would be un-

wise, just as I take it that any report by the trustees of State College this afternoon would be unwise. If I may make the suggestion, I would suggest notifying the trustees this afternoon that you have the committee of this body willing to confer with a committee of their body to work this problem out and in that way take the initial step for conference and not take an initial step of absolute declaration of your purpose. In other words, I think it is always good, brethren, to hear both sides of the case before you make up your mind as to the disposition thereof.

That is merely a suggestion in passing. If such a committee were designated here, it could carry this report or any other matter that would be presented here to the committee of the trustees of the college, and since you have exactly the same interests at heart that they have, surely you could get together in that way. That probably would be the most satisfactory to both of you and perhaps to the best interests of agriculture at large. That is simply a suggestion in passing. Now I don't want you, dear brother, to make any motion on that.

Now I want to say something more if you will allowed me: First, I have an important series of conferences up on the Hill in a very few minutes and shall be obliged to vacate the Chair and ask the man who really ought to preside to come into his own; but before doing that I just want to say a word or two to you. In the first place, I should like you to read with considerable care what I said on Tuesday last on the subject of agriculture and make that, if you please, at some time during your session, the basis of some discussion here. If what I have said there is not the thing that ought to be said I trust you will be frank enough to tell me so, because I have no pride in the language and no pride in the thought expressed there whatever. What I honestly tried to do was to say to the people of Pennsylvania that the agricultural interests of this Commonwealth are so vital to its whole population that everything that the wisdom and the experience of our people could do should be brought to bear in the solving of the agricultural problems of Pennsylvania.

As you very well know, we have had a growth of agricultural interest. Legislature after Legislature has created department after department. I confess to you very frankly that I don't know what these different departments do. I don't know how many of them tramp on each other's toes. I don't know how many of them leave wide gaps of untouched service between their different functions. Perhaps you don't know, but this I know, that first of all we should make a clear demarkation between the teaching functions in agricultural administration and the purely administrative functions in agricultural education, and having drawn that line we should turn to each field of endeavor and organize it into a scientific and efficient service to the farmers of Pennsylvania. If there is a duplication of clerical effort to a conflict of clerical services, let us eliminate that. We are not here to create offices and to take care of a lot of political accidents. We are here to make the money from the Treasury of this Commonwealth reach back into the farm and bring a larger crop of food from the soil to the whole people of Pennsylvania. (Applause).

Now you see, therefore, that this thing requires at every step, the most careful, the most accurate, the most considerate attention on the part of all of you who, by law, have to do with this problem and see whether we cannot work out a program of efficient administration and efficient instruction that will actually meet in the largest way and at the least cost to the people, the interests that we all have at heart. Now you have heard one report read here; you will hear others. Do you think it is a satisfactory showing, good as it was, aside from one or two problems? We are getting about $18 or $20 for an acre of Pennsylvania soil. Is that a fair return? Count out of that the cost of living, the cost of production of that amount of foodstuff, and see what a pittance remains. I make the definite statement that it is easily within the reach of the people of this State to double the output of each acre in Pennsylvania in ten years if we want to do it. Now take your pencils and figure what it would mean to the farmers of Pennsylvania; what it would mean to the industries of Pennsylvania in the cheapness of the food of our toilers and in the enriching of those who produce the food back upon the soil.

My friend who recently came to this country from Belgium and traveled over it in a provisional capacity, pointed out that the thing that impressed him wherever he went was the terrible waste of our people. We throw away almost as much as we save of the products of our industry and the bounty of our soil. I was completely mad the other day when I saw a fellow selling apples from a huckster wagon with a half-bushel measure, all kinds of apples mixed up, as we Dutch would say, "verhuddled," until you did not know whether he was selling Northern Spies or Ben Davis or rotten apples or sound apples or good apples or bad apples. Of course he got nothing for them and he did not deserve anything, selling them in that way. I think we should begin with a study of the soil and follow that with a study of seed and follow that with a study of treatment of that soil for the reception of the seed and following that we should trace the growing crop until it reaches a point where it is fit for the market; then study the method of marketing and selling, tracing that thing out step by step and at each step, reducing the whole procedure to a scientific thing and you will find that instead of 35% of the market price of your food stuffs going back to the farm, 50% or 60% would go back to the farm. Why, next to the automobile business, the most extravagant business in America to-day, is the marketing of our farm crops. We are throwing away with the air of prodigals the very wealth that ought to go back in terms of better treatment and enrichment of our soil.

Now I was born on a farm. I am not talking to you from a textbook; I am talking to you from a hillside farm, which, at points, was so steep that when apples fell off the trees they alighted in the public road at the foot of the hill. I know something about this thing and I know what I am talking about for the central counties of Pennsylvania, and I wish you would make it, as a body here, a matter of scientific study and then those of us that are committed by you to the important task of organizing the service for the farmers ought to take these various activities and organizations that are working for the farm, and organize them into the largest and most economic service we can possibly have in Pennsylvania.

I want to say to you very frankly that I have in mind some treatment along that line of this problem and I want your co-operation and your considerate judgment upon the matter when once it is sufficiently matured to lay it in proper form before you. I am just glad to be here, to look into your faces for a minute, to sit in this Congress of important men and entrusted with a vastly important service, together with the one woman who belongs officially to your family, and to tell you that always and everywhere, every one of us from your Governor up, should stand absolutely steadfast for better treatment of the soil and better conditions on the farms of Pennsylvania. (Applause)

At this point Governor Brumbaugh retired and Mr. Killam took the Chair.

The CHAIRMAN: We are on this resolution. Mr. Herr, will you renew your motion, whatever it was? There was also some motion made as a substitute, my recollection is that had no second.

MR. JOEL A. HERR: I wanted to make myself a little clearer.

The CHAIRMAN: Just renew your motion.

MR. JOEL A. HERR: I did not make the motion: Dr. Conard made the motion to adopt the resolution. The point I made was that we did not act in that voluntary service without authority, we simply prepared that as a suggestion to bring before the Board and invite their participation in the discussion of this matter so that the Board itself might produce something that we would bring before the State College trustees. It was presumed that possibly this committee or some other committee would convene then for discussion in this matter or our recommendation in this matter, rather, to the Board of Trustees of State College and try to arrange some co-operation with them.

MR. KERRICK: I move that this committee be appointed to confer with the Trustees of State College.

The CHAIRMAN: Well, that would be a matter of after consideration. The idea is to dispose of this resolution in some way or other, let the resolution go away from here with the approval or some action of the Board, then we can get it to another committee and that committee can confer with the committee of trustees. Is there any other discussion on this motion?

MR. HUTCHISON: I think Secretary Critchfield's motion is the one that took care of this and it was seconded by the gentleman from Monroe. That motion was that it all be referred to a committee.

The SECRETARY: My motion was that it be referred to the Committee on Resolution which will report later. That committee is to be appointed yet and that committee is supposed to bring in its report, whatever is, to be adopted by the Board.

MR. HUTCHISON: I would like to amend your motion that that committee, when appointed, confer with a similar committee from

the Board of Trustees of the college with power to confer with a similar committee to be appointed by the Board of Trustees of the college.

A Member: We have two motions before the house. I think Dr. Conard's motion has to be disposed of first.

The SECRETARY: I will accept the suggestion made by Mr. Hutchison. Someone made a remark that it was not in order to make a motion as a substitute for a motion which had already been seconded and discussed. On the contrary it is quite in order. A motion will be presented without anybody knowing exactly what it contains and after some discussion it is discovered that it is not exactly the thing to which the body wishes to commit itself, then comes in the substitution and the motion to substitute is always in order, so that really the motion to substitute is the motion that is before the Board.

The CHAIRMAN: Will you please renew your motion that you made to substitute?

The SECRETARY: My motion was a substitute to this motion that the report be referred to the Committee on Resolutions, which will be appointed later in our session, and which committee, of course, will report at the time fixed in the program for its report. Now, Mr. Hutchison asks me to accept as an amendment that it be referred to the Committee on Resolutions and that we ask the Board of Trustees of State College to appoint a like committee to confer with our committee to see if they cannot reach some agreement.

The CHAIRMAN: I think we are getting a little too much before the house at once. Let us dispose of your motion and then Mr. Hutchison will make a motion.

MR. BLYHOLDER: By doing this we will have a committee to confer with the Board of Trustees after they have gone to their homes and our committee will have gone to their homes, so that much of our work will be done after it is of no benefit. That was the object of having this preliminary meeting yesterday, that the thing might be acted on at once and something accomplished. The Board of Trustees, I understand, meets this afternoon and it seems to me if we want to confer with them, we had better do something at once.

MR. FENSTERMACHER: It seems to me that it will be hardly worth while to go through all this. If the Congress of the United States passes a bill, how are we or the State College going to change it. We will have to take it the way it is coming or leave it, that's all we can do. We can pass some resolution here requesting Congress to change that bill so it suits our views.

MR. A. P. YOUNG: It seems to me extremely important to take no action to bring the State Department of Agriculture in conflict with the National Department. We should endeavor to harmonize them.

MR. JOEL A. HERR: The Committee on Resolutions, as I understand it, will be appointed by the newly elected Executive Committee of the Board, which will not take place until to-morrow, at least, and as the program does not fix any time for the election of officers, we don't know when it will take place.

The CHAIRMAN: Gentlemen; you heard the motion, offered as a substitute, that this be referred to the Committee on Resolutions? Is there any further discussion?

The substitute motion was then put and lost.

The CHAIRMAN: The noes have it. Now the question will came up on the adoption of the resolution. What was your motion, Dr. Conard.

DR. CONARD: That the resolution be adopted as read.

The motion to adopt the resolution was then passed.

The SECRETARY: Now, Mr. Chairman, I would suggest that if you are going to appoint a committee to confer with a like committee to be appointed from the Board of Trustees of the College, now is your time. That committee will know exactly what their instructions are and what they will have to present to that joint committee.

The CHAIRMAN: Will someone make a motion?

MR. KERRICK: I move that this committee be appointed to confer with the trustees of State College.

The CHAIRMAN: At what time?

MR. KERRICK: This session.

The motion was seconded and adopted.

The CHAIRMAN: If there is no objection, I will continue this same committee.

The SECRETARY: That was the motion.

The CHAIRMAN: Well, there would be on that committee, Joel A. Herr, C. H. DeWitt, S. S. Blyholder, Matthew Rodgers and Dr. M. E. Conard. There was a committee appointed at our last meeting at Stroudsburg, a Memorial Committee, that may be ready to report. Col. Woodward is Chairman of it. Is Colonel Woodward here?

MR. JOEL A. HERR: He is in town.

The CHAIRMAN: Mr. Hutchison is on that committee. Mr. Hutchison are you ready?

MR. HUTCHISON: I would prefer to leave that until Col. Woodward comes in.

The SECRETARY: Reference was made to the fact a few minutes ago that the period for election of officers was not indicated on the program. That was left blank in order that we might see whether we could bring it in early in the session or not, after we got here. I

move you, therefore, that the election of officers be made the order of the day for to-morrow morning at 9 o'clock.

The motion was seconded and adopted.

The CHAIRMAN: There is a Committee on Roads and Road Laws. Mr. P. S. Fenstermacher is Chairman of that Committee. Mr. Fenstermacher, are you ready to report?

Mr. Fenstermacher then submitted the following report:

REPORT OF COMMITTEE ON ROADS AND ROAD LAWS

By P. S. FENSTERMACHER, *Chairman.*

The question of good roads, from an economic standpoint, is one of the greatest questions before the American people to-day. The Nation's commerce begins with the township road. Any system of roads and road laws that loses sight of this unit as the beginning of all road improvement and sees only a Lincoln or scenic ocean to ocean highway, or one to connect two distant sections of the State, will be more sentimental and ornamental than practical. We believe that a system of highways connecting the rural districts with the nearby market towns and railroad stations, will be a great uplift to agriculture and also to the consumers of all farm products.

The New York State Highway Commission is working out a plan for a system of twelve thousand miles of highways, rearranging its county systems so that there will not be any section of New York State outside of the Catskill and Adirondack Mountains, that will be further away than five miles from any improved state or county highway; and eventually intends to build connecting links in these five mile breaks, so that every man in New York State will have a road twelve months in the year. Former Governor Glynn of New York, in one of his messages to the New York Legislature, has said that macadam roads were costing New York on an average of $12,000 per mile to build, and $1,000 per mile per year to maintain, and at the expiration of ten years, it was necessary to resurface them at a further expenditure of $6,000 per mile. Governor Glynn did not mean that these excessive construction and maintenance costs were due altogether to political corruption or contract jobbery, but that macadam roads will no longer withstand present day traffic. I have cited New York State merely as a neighboring example, showing that with all their millions of bonds issued, the road problem with them is not yet solved.

Here in ours, the Keystone State, a proposition just as gigantic confronts us. Our percentage of improved roads is only four per cent. or three thousand four hundred and seventy two miles, out of a total of eighty-seven thousand, three hundred and eighty-six. What are we to do? Shall we construct roads that are not going to stand present traffic conditions, or shall we build permanent highways

that, although somewhat higher in initial cost, more than balances in the matter of maintenance. We are all aware that it will be many years before even all the main highways are permanently constructed, and that, for a generation at least, most of the highways and byways of the State will remain what are termed dirt roads. It has been amply demonstrated that these dirt highways can be made excellent roads eight months in the year and passable the other four months, by following just a few simple rules in road maintenance.

First. Proper drainage.

Second. Sufficient crown to shed water.

Third. That the Road Drag, properly applied, is the most efficient and economical implement with which to maintain a dirt road.

An expert on modern road construction has given me the following figures as to original cost and maintenance costs for the types of pavements now being constructed throughout the country, all based on the per mile with a width of sixteen feet.

INITIAL COST		MAINTENANCE
Macadam,	$8,000 to $11,000.	After 2 years, 10%.
Brick,	$15,000 to $18,000.	After 5 years, less than 10%.
Concrete,	$12,000 to $14,000.	After 5 years, less than 1%.

With all the experimenting that our State Highway Department has done with macadam, it has been demonstrated that it cannot construct such a road that can be economically maintained. Too long has the State been building such roads at a great cost, and without any provision for their timely maintenance, allowing them to go to rack and ruin. And whoever was responsible for this, was criminally negligent.

As to the brick method of road construction, we find from a report of the Milwaukee County Highway Department, from a section of the State of Wisconsin where, for a number of years, many different kinds of paving roads have been built, the subject as they are to heavy motor traffic, as well as to a large tonnage carried in horse drawn vehicles, our highways demand a surface which can withstand the greatest amount of abrasion. Water bound macadam, or gravel, is out of the question, brick or macadam foundation is unsatisfactory, and if laid on concrete foundation, becomes too expensive. In similar manner, bituminous macadam, or bituminous concrete, is unable to stand up unless placed on a permanent foundation, and the element of cost therefore arises again.

Also, the other types of block payments are excessive in cost. In sections of our own State where bituminous macadam or bituminous concrete roads have been constructed, it has been found, when built to a width of 16 feet, to be very objectionable from both the standpoint of excessive cost, as well as not being a suitable road for horse drawn traffic, the surface being too smooth and hard so that horses have no footing and are unable to draw more than half a load up

any slight grade, frequently slipping and falling down upon stretches that apparently have no grade. A beautiful well built road of bituminous concrete construction situated in the eastern part of the State has become a motor speedway, horse traffic making detour of miles to avoid using it on account of danger of injury to horses by falling. Also, in the same section, a bituminous macadam construction across the South Mountain, the same difficulties have been experienced, horses having no foothold, being unable to draw half the loads as before the road was improved. The complaints against this method of surfacing becoming so numerous that the plans for completion of this road have been changed to a macadam and it has been thus constructed.

Referring again to the report of the Milwaukee County Highway Department, they give the following as the reasons for the selection of concrete as a paving material.

First. Durability.

Second. Low maintenance cost.

Third. Cheapness and availability of materials.

Fourth. Simplicity of construction.

Fifth. Low initial cost.

These all resolve into a question of economy which, when combined with ease of traction, smoothness, non slipperyness, cleanliness, and sanitary qualities, make concrete as nearly an ideal pavement for rural highways as could be devised for Milwaukee county. We believe that similar results can be obtained in Pennsylvania, through a properly constructed concrete pave. With mills for the manufacturing of cement, and with other materials for concrete work near at hand in all sections of the State, this method of road buildings is certainly more economical and practical than the imported asphalts required in the construction of the bituminous surfaced paves. To increase the efficiency of the paved roads, and also, reduce their cost so that it will be possible to construct roads of this nature throughout the entire state, we recommend that a plan for road building somewhat similar to the old time turnpike, with eight foot pave construction in the center, allowing for an additional eight foot of macadam on one side, and eight foot of dirt road upon the other side, giving a total road bed of twenty-four feet, suitable for all manner of traffic, at all the seasons of the year:

Ditch.
8′ Macadam
8′ Pave
8′ Dirt
Ditch.

For reasons of safety, utility and economy, we further recommend that no road should be improved that is of less width than twenty-four feet from ditch to ditch. Whatever system, or kind of materials, for building of improved highways are selected, the aggregate cost will, for all time to come, be a severe drain upon the revenues of the State.

We heartily endorse the recommendations of the Special Road Committee for the purpose of devising ways and means to build and maintain the highways of the Commonwealth, as reported and adopted at the Stroudsburg meeting of the State Board and printed in Department of Agriculture bulletin No. 253. We would call special attention to the third item, which recommends, "a pay as you go" policy, and as opposed to a bond issue, feeling confident that the revenues of the State, properly applied, are sufficient to carry on this work. We believe that the indiscriminate appropriation of the State funds for all manner of educational and charitable institutions not owned or controlled by the State, many of which could, by proper management, be made self-sustaining by the municipalities in which they are located, is both wrong in principle, as well as of doubtful legality. We believe the appropriation of the State funds to any educational or charitable institution under sectarian or denominational control, to be unconstitutional, and that it is time to call a halt. The results of such aforegoing mentioned legislation have been vicious and demoralizing, being a constant temptation to unscrupulous persons to apply for State aid for the establishment and maintenance of such institutions, a new crop being born and aided at every session of the legislature through the disgusting log-rolling manipulations to secure the passage of a bill for their support.

As to road laws, in an address before the American Association for the Advancement of Science, by Logan Waller Page, Director of the United States Office of Public Roads, the Pennsylvania Highway Department was cited as being one of those in which millions are wasted through political manipulations. This being a serious charge, with no specific acts mentioned, it may be well to quote more of his address in order to see in what he states a parallel of the conditions as many of us may have observed them. Mr. Page's reference to this State and its political road building was part of a general discussion of conditions throughout the country. The American people, he said, just build up a wall of protection against political meddlers in all branches of public service. We have in our public road system, if it can be called such, approximately, 2,300,000 miles. The people, as a public corporation, are consenting to the expenditure of about two hundred millions in a haphazard attempt to make this rash endeavor pay. That it is a losing investment, conducted on lines directly opposite to those of the best managed private corporations, is an established fact. It is estimated by experts that every year the American people lose at least fifty million dollars because of their careless supervision of the traffic facilities; it is the lack of definite responsibilities which bring about the failure of the local work, and State supervision seems to be the first and most effective step toward obtaining satisfactory road conditions. To safeguard against the many evils confronting the people of the state in planning their systems of road management, the following is offered by Mr. Page:

"First, the appointment in each unit or substation that number of road officials necessary to do the definite duties and placing upon these men the distinct responsibility for the work done.

Second, some arrangement should be made whereby the road officials shall give the roads systematic and continuous attention instead of the irregular care which has proved so costly in the long run.

Third, the requirement of necessary qualifications which the road official must possess to discharge his duties efficiently.

Fourth, the demand that the incumbent of any road office shall be appointed because of his qualifications in this way eliminating those who are more able as politicians than as engineers.

Fifth, road officials would serve best the people if the term of office was limited by merit and not terminated at regular periods.

Sixth, provisions should be made for a careful study of traffic needs in the various localities, so that political considerations may not be the deciding factor in the location of road improvement, distribution of appropriations and appointment of needed officials.

The people should have a strict, clearcut, civil service legislation, applicable to the entire road system in each state, which would give them the necessary power to recall incompetent officials.

Most decidedly, all subordinate positions should be filled by rigid competitive examinations, without regard to party affiliations.

Perhaps, however, the most effective measure of safeguarding the state highway department from the destroying influence of politics is to place it under the general control of a commission. This commission should be non-partisan, non-paid, constituted partly by appointment and party ex-officio, on which would be represented the educational and scientific institutions of the state, the appointive members alone being laymen.

These men should be trusted to select the chief technical officials without prejudice and with due regard to their qualifications."

Coming from such high authority, these advanced but common sense views upon this great question, are certainly worthy of careful consideration. We believe that their application will bring about a new era in the State's highway construction and management so that before many years, Pennsylvania's reputation for good roads will be redeemed.

It was moved and carried that the report be adopted as read.

The CHAIRMAN: We are now ready to hear from Mr. W. F. Biddle, Chairman of the Committee on Fruit and Fruit Culture.

Mr. Biddle then submitted the following report:

REPORT OF COMMITTEE ON FRUIT AND FRUIT CULTURE

By W. F. BIDDLE, *Chairman.*

Mr. Chairman and Members of the State Board: The apple crop of 1914 will go down in history as one of the largest, the yield being about 20,000,000 bushels. With this large yield, thousand of bushels went to waste for the want of a market. We have found that part of this waste could have been prevented had there been a canning factory or evaporating plant in easy reach, or had they followed one of the two established systems of retaining soil moisture, or thinned their fruit. The long and severe drought, which covered nearly the whole area of Pennsylvania, influenced the undersize of the fruit. There are a number of fruit growing sections that ought to have canning factories. There is a demand at the city bakeries, restaurants and hotels for canned apples, with the variety named labeled on the can. Much of this waste may be traced to a lack of co-opera-

tion among fruit growers. It is our duty to see that nothing is wasted when there are so many hungry to be fed. Too large a percentage of the fruit growers are not careful how they handle their fruit at picking and packing time; then when their fruit is put on the market along side of that of the careful and efficient grower, he receives from $1.00 to $2.00 less per barrel on account of their carelessness.

Now it pays to do things right. The last season there were apples sent to the Philadelphia market by some of our Pennsylvania farmers and fruit growers that were not honest and straight. There was no uniformity in size and color. In several cases I believe the object was intentional deception. Improper methods of displaying fruit have been practiced on several occasions. Great care is taken to have the large and highly colored apples placed in such a position that they can be seen and at the same time hide the undersized apples. Upon investigation I found that these persons must each year hunt new buyers for their fruit. It is with some effort that I make these conditions public, but they are nevertheless facts.

PESTS

In many sections of the State the San Jose scale is held in check, in others it has practically destroyed the orchards and very little or no effort was made to prevent their destruction. The Aphis, during the past year have done a great deal of damage in the State. These can be kept under control by spraying just as the buds open. The Codling moth is the one that is causing the careful grower a great deal of concern. For the man who can put up the 100% clean box or barrel is the man who gets the premium. We have found that in many cases the spraying is done by the "get done quick" method. This is a waste of time and material. If you do not want to do it thorough, you better not do it at all.

OVERPRODUCTION

The cry of overproduction is still ringing loud over the country. From a report given me it is estimated that there were 40,000,000 less trees in the United States in 1910 than in 1900, against an increase of 20,000,000 in population in the same length of time. As our population increases just in such proportion will the consumption increase, provided we give them clean and straight fruit. Fruit tree planting in Pennsylvania is growing less. There will not be as many planted this year (1915) as there were last year (1914). From what I can gather if the present rate continues in the year 1920, 50% of the present farmers' fruit trees will be dead. In the State there are many places where whole orchards are bad from lack of proper care. So it behooves us to control the scale, codling moth, aphis and all the rest of the enemies of the fruit grower.

It is always the one that sticks to it that wins in the end. I know that the practical, up to date and efficient orchardist is the one that will win. From what I have learned I believe that in every established fruit county there should be an information bureau, whose business it would be to ascertain where apples, or other fruits, can

be handled to best advantage, and to keep the growers informed as to the prices and to assist in establishing a standard for the county, and then maintain that standard by being honest. There were only a few counties reported less than 100% and some as much as 500%. 100% indicates last year's crop.

The peach crop was heaviest in the southeastern part of the State, Montgomery reporting 2,000,000 baskets. In many of the other counties the crop was a total failure. In some places peaches sold from $1.25 to $1.60 per basket, but in some orchards they were as low as 25 cents per basket. This confirms me that this Board ought to devise some means whereby the over supply could be sent to other counties where the supply is not sufficient for the demand and sold at a reasonable price to the consumer and at a profit for the grower. Mr. L. W. Lighty quoted October 17th that he saw peaches sell at $1.50 per basket 54 miles from the orchard where they were bought for 30 cents per basket. I believe we would be of much benefit to the grower if we can help him solve some of these problems. There is too wide a gap between the producer and consumer and there has been no bridge sufficiently strong to span this abyss. The foundation is bad and when either party attempts to cross, down goes the bridge. So it is with the consumer or producer if either one tries to take advantage of the other.

MR. BLYHOLDER: I move that the report be received and spread on the minutes.

Motion seconded.

The CHAIRMAN: You have heard the motion that the report be received and spread on the minutes. It seems to me that this report should have some action by the Board, either be adopted or rejected, and then spread on the minutes afterwards.

A Member: I move to amend by adopting the report.

MR. BLYHOLDER: It seems to me that in adopting a report we ought to discuss it, to know whether it embodies exactly the ideas of this body. By adopting a report we make that our report and our standard. This is the report of a specialist.

The SECRETARY: I am in full accord with Mr. Blyholder's views of that matter. Every report is supposed to contain something that the Board will recommend or cut out, and when you adopt the report you are committed to it, you make it your sentiment; those are the sentiments of the Board. Therefore, when a motion is made that a report be adopted and it is open for discussion, if anybody has any objection to anything contained in that report, that is the time for them to speak. If there is no discussion, if no one indicates a desire to discuss the question and the motion to adopt is voted upon, it becomes the expression of the Board. Now, then, when the report is simply received and accepted from the committee, the committee can consider itself for the time being discharged; but the adoption of the report means the committing of this body to that report, to whatever the report contains.

I was hoping that the gentleman who made the last report would suggest some means by which this committee or a committee appointed by the Board would be able to bring about just what he said ought to be brought about, the concentration of efforts on the part of the fruit growers of the State to get to the very best market that was possible. I thought possibly he would suggest that this fruit committee, as a standing committee, would have this as a part of its duties, to get into correspondence with the fruit growers and see if there could not be some organization effected of the fruit growers through which they would be able to get the fruit from sections of the State where there was a large quantity of fruit grown, to the markets where the fruit was demanded. Now I simply got up to make the statement of the difference between receiving a report and the adoption of that report, and if there is not anything in the report that is objectionable to anybody I think it would be well to adopt it. If not, let the motion just stay as it was made.

MR. BIDDLE: The reason I did not make any statement or devise any plans is that we have on several occasions tried to devise plans in our county but, as I stated in my report, I have investigated several cases and found that the fruit grower on one or two occasions was to blame for not finding a market for his fruit the second year from the simple fact that he tried to deceive the consumer, and the man that handled his fruit by placing the smaller fruit in the center and the nicer fruit on the outside of his box. I saw apples sold this last year that were not much larger than hickory nuts with the hulls on, and the buyer took them, which hurt the market price of the applies in Bedford county, because, when apples from that county come to the market again, the buyer would say, "I don't want any apples from Bedford county," where he should have said, "I don't want that man's apples." There is the point; I think we ought to try to devise some means whereby we could compel a man to be honest. That looks like going a great way, and if this Board could devise some means whereby we could get the consumer and producer closer together, I believe it would be doing a great work.

The CHAIRMAN: Gentlemen, you heard the question. I believe when these reports are read and discussion is invited and there is no discussion on these reports, I think the Board virtually adopts them. You have heard the motion. Those in favor of it will signify by saying Aye.

The motion was adopted.

MR. J. ALDUS HERR: Mr. Chairman, the Committee on Credentials is ready to report.

The CHAIRMAN: We will now hear the report of the Committee on Credentials.

Mr. Lohr submitted the report of the Credentials Committee, as follows:

REPORT OF COMMITTEE ON CREDENTIALS

Your Committee begs leave to report that the following named persons, whose credentials are in regular form, be admitted as members of the State Board of Agriculture:

County	Name
Crawford,	W. F. Throop
Adams,	A. I. Weidner
Luzerne,	J. E. Hildebrant
Lycoming,	A. J. Kahler
Pike,	B. F. Killam
Sullivan,	G. Eugene Bown
Lehigh,	P. S. Fenstermacher
Huntingdon,	George G. Hutchison
Northampton,	C. S. Messinger
Centre,	John A. Woodward
Juniata,	Matthew Rodgers
Bedford,	Wm. F. Biddle
Venango,	Wm. A. Crawford
Chester,	M. E. Conard
Beekeepers Association,	Edgar A. Weimer

We also recommend that the following named persons be admitted as delegates and have the privileges of the floor:

"Lebanon, Pa., Jan. 11, 1915.

"This is to certify that at a meeting of the Lebanon County Agricultural and Horticultural Association, held Jan. 9th, 1915, Edward Shuey, Lickdale, Pa., Clark C. Long, Jonestown, Ja., John H. Bennetch, Newmanstown, Pa., Edgar A. Weimer, Lebanon, Pa., E. S. Risser, Lawn, Pa., S. P. Heilman, M. D., Lebanon, Pa., were named Delegates to the Meeting of the Pennsylvania State Board of Agriculture, Harrisburg, Jan. 26-28, 1915.

S. P. HEILMAN, Secretary."

We also recommend C. L. Hood of Allegheny county as the regularly elected member from said county, and that B. A. Marshall, who is present as a substitute, having his expenses of this meeting paid.

This is to certify that J. W. Bruckart of Lititz, Lancaster county, is a member of the Lancaster County Farmers' Association of Mechanicsville, Pa., in good standing and this Association has appointed him as their Delegate to represent their Association at the annual meeting of the State Board of Agriculture at Harrisburg, Pennsylvania, January 26-29, 1915.

(Signed) J. W. ROOT, President
M. G. BRUBACKER, Secretary."

Credential Committee
J. ALDUS HERR, Chairman.
J. H. WILSON,
WM. C. BLACK,
J. N. GLOVER
ROBERT W. LOHR.

The following named gentlemen were subsequently received as delegates: Mr. Bock, Mr. Towns, Mr. Membold, Mr. Clark and Mr. Reeder, representing the Hughesville Agricultural Society; also Hon. Frank Marvin and R. E. Cleveland, of Tioga county, Joseph Beckler, representing the Agricultural and Horticultural Association of Schuylkill county.

MR. J. ALDUS HERR: Mr. Chairman, I have with me the proper credentials from Allegheny county for Mr. C. L. Hood, whom we recommend as a regularly elected delegate by the Association. This was dated January 21st. Now there is a letter dated January 22nd, from Mr. Hood substituting Mr. B. A. Marshall. Now Mr. Marshall is here representing Mr. Hood and I move you, sir, that Mr. Marshall's expenses be paid for this meeting. He came here with good intentions, no doubt about that, but Mr. Hood is recommended as the member elected, and in case he does not wish to serve, he should send in his resignation through the proper channels and have someone else appointed.

The CHAIRMAN: Gentlemen, the report of the Committee will now be taken up. What will you do with this report of the Committee on Credentials.

MR. FENSTERMACHER: I move the adoption of the report.

Motion seconded.

The CHAIRMAN: Are there any remarks?

The SECRETARY: Mr. Chairman, there is one item in this report that is a little out of the usual line. The question of allowing the expenses of someone who is sent by a member of the Board to substitute him at the meeting, was referred to me by letter, and I said that it was not regular and recommended that that should not be done. My reason for making that recommendation was that this is a body that exists by act of Assembly. The people who come here come as the representatives of the county from which they come just as men come to our General Assembly from those counties, and the question that came up to my mind immediately when I received the letter, was, does the Board have the right, or would I as an official member of the Board, have the right to say that this shall be done? Suppose a member of the General Assembly, on account of sickness or some business requirement that would keep him at home, could not attend; could he take the matter out of the hands of his constituents and say, "This party shall go to represent me or to represent you?" Therefore, I advised against it and if you adopt this report, of course you take it out of my hands, which you have a perfect right to do, the Board then would be responsible and I would not be.

MR. FENSTERMACHER: I withdraw my motion with regard to that part of it.

The CHAIRMAN: I think that would be more properly included in the other motion that his expenses be paid by the Board. Merely adopting this report would be adopting the report of the Committee on Credentials.

The SECRETARY: That is a point you want to think about.

A Member: I move that that part be stricken off.

The CHAIRMAN: There is nothing before us but the question of the adoption or rejection of the report of the Committee on Credentials.

MR. J. ALDUS HERR: We have not done that with the intention of antagonizing the Secretary or anything of that kind.

The SECRETARY: No, I don't take it that way, but have we a right to do this?

MR. J. ALDUS HERR: I doubt very much whether we have a right to do it. We have a right to recommend and the Board can vote the amendment down or not, as it sees fit.

MR. JOEL A. HERR: I think it is a dangerous precedent, I think it may be followed up by any member of the Board here if he cannot come sending a representative and saying, "You admitted another man to represent another fellow, why can't I do the same thing?" I think it is a dangerous precedent and should not be adopted. The regular report is moved and seconded.

MR. LOHR: There may be some misunderstanding with regard to this report. The regularly elected member from Allegheny county of the State Board of Agriculture is Mr. Hood. Now, Mr. Hood did not, in his letter, send Mr. Marshall as a substitute, but he takes it upon himself as having authority to appoint someone else in his stead to act as a member of the State Board of Agriculture, which no doubt he had no right to do. There is no question about that and some members of this Credentials Committee thought that since Mr. Marshall is here and came thinking his credentials were clear, it was no more than fair to make an attempt, at least, to have his expenses paid if such could be done; but we all recognize the fact that he is not the regularly elected member from Allegheny county, that he was only appointed by Mr. Hood, who was the elected member, and Mr. Hood has no right to appoint anyone in his stead.

DIRECTOR MARTIN: Would I be permitted to make a remark, simply by way of suggesting a way out of this little dilemma. Would it be in order for this Board to recommend to its Secretary and Treasurer that if, within the bounds of right, if it could be accomplished that he pay the expenses of Mr. Marshall to this meeting and leave it that way. And I may say that Mr. Marshall came here not only in the interest of the Board of Agriculture, but he came also in the interest of the Farmers' Institute work and I would suggest, if it is impossible, the Board to pay his expenses, I think we can find a way to pay Mr. Marshall from the fact that he is here on an errand relative to the Farmers' Institute as well as the State Board meeting.

The SECRETARY: Mr Chairman, I am entirely willing that the Board shall vote to put that responsibility on me, if it wants to, but I can assure you, in the beginning, that the only thing I will do will be to put over upon the Auditor General and I will be very glad to do that.

A Member: And he will send it back.

The SECRETARY: Whatever the Auditor General does, of course we will have to abide by. I will not knowingly violate the law and I have given you my view of the matter. I think the man who comes here, comes as the representative of the people of his county, and I don't think he has any more authority to name a substitute or one who shall take his place in council of this body than a member of the General Assembly has to name a substitute, if he cannot come. But so far as the payment of expenses is concerned, I shall be very glad indeed, without any further action on your part, to refer that to the Auditor General's Department and let it be settled there where it properly belongs.

The CHAIRMAN: Gentlemen, you have heard the motion that the report of the Committee be accepted, except as to the report concerning Mr. Marshall, from Allegheny county. Is there any further discussion?

The motion was then adopted.

The SECRETARY: I think you had perhaps better move that the Secretary be asked to take the matter up with the Auditor General.

MR. BIDDLE: I move that our worthy Secretary be asked to take that up with the Auditor General.

The motion was seconded and adopted.

The CHAIRMAN: Mr. Secretary, you understand the motion?

The SECRETARY: Yes, and I will make as strong an appeal as can.

The CHAIRMAN: Is Prof. F. D. Kern, of State College here? Prof. Kern will now make a report as Botanist.

Prof. Kern then submitted the following report:

REPORT OF THE BOTANIST

By PROF. FRANK D. KERN.

In making this report, your speaker has some misgivings. In the first place, he has not resided in the State long enough to feel thoroughly acquainted with the problems offered in such a diversified length of time that a report of this sort would be expected.

Botany is a broad and fundamental subject. As a division of science there comes under the head of botany much information which is of interest and importance to the agriculturist; but it is my experience that few people who want such information know where to look for it. This point is well brought out by an examination of correspondence. If a man wishes information about farm animals he has a pretty good idea that he should consult someone interested

in animal husbandry; if interested in farm crops, he looks to an agronomist, and so forth. Questions, however, which ultimately come to a botanist are pretty likely to be asked of someone else first, or addressed to a general board or to an institution. This is not strange, after all, for botany deals with plants in all their phases.

While it does not represent any industry, it is very closely related to several. Forestry and horticulture are very much dependent on botany. The whole problem of soils and their handling and fertilization is related to the physiology of plants, which is but a phase of botany. Bacteriology, dealing with a particular group of plants, may now seem very distinct, but it is simply a split from the general subject of botany. Scientific plant breeding has been developed because of an outside demand, but it owes its methods and rapid advancement to the fundamentals coming directly from botany. The latest and one of the most important phases of botany deals with the diseases of plants. This phase we know as plant pathology. While there is some tendency to separate it from the mother science, I think I may say safely that it is still to be considered as belonging to botany.

To be more specific, I may now treat briefly some of the practical botanical questions which are of general interest as is evidenced by the character of our correspondence. In the first place, I may speak of the requests which come to us to name and identify plants; the species are likely to be anything from grasses to trees. Very frequently the specimens are entirely inadequate, being fragmentary and injured. I should urge everyone present to assist in this matter by advising, whenever opportunity affords itself, that carefully packed, ample, representative, specimens accompany requests for determination. While many of the plant identifications are purely general, a large percentage of them have to do with plants which are recognized pests, or weeds. Usually these are accompanied by requests for information concerning methods of eradication of control. Here the domain of the botanist gradually shades off into that of the agronomist.

Concerning the question of eradication of weeds, I cannot improve upon the statement of your former botanist, that "there is ordinarily no quick, shorthand way of getting thoroughly rid of pestiferous weeds." I am sure, nevertheless, that all of us have felt much encouraged over the developments in recent years of spraying in this connection.

You will be interested in hearing, I am sure, that there has appeared during the year, the publication of successful results in the results in the control of wild garlic. This investigation has been carried on at the Indiana Experiment Station. The spray material used is a petroleum product sold by the Standard Oil Company under the name of orchard heating oil. It is a complete spray, killing all vegetation which it strikes, and not a differential spray like iron sulphate, which kills weeds but does not injure the cereals. The results are very promising.

Closely allied to the subject of weeds is that of poisonous plants. We have had during the year several inquiries concerning the eradication of poison ivy. It has been logical to suggest the pouring of some chemical solution about the roots of the plants. One corre-

spondent reported back to us that he had good success with strong, hot brine. In this connection, it might be interesting to point out that the usual bad effects from coming into contact with poison ivy may frequently, and perhaps usually, be avoided in a simple manner. It consists in thorough washing, with the aid of some good laundry soap. If the washing is not delayed too long after contact with the ivy, the chances of poisoning are very much lessened.

Questions relating to seeds are also constantly coming up and these are frequently of a botanical nature. Questions concerning the purity and germination of farm seeds have been considered, commercially, so important that the last Legislature saw fit to pass certain laws on the subject which, I believe, are administered by the Secretary of this Board. Reduction in yields of cereals, particularly oats and wheat, are often due to smuts and other diseases which are carried over from year to year on the seed. The spores which carry them over are microscopic and are, therefore, not detected by ordinary methods of examination. The presence of such diseases is in reality just as much an adulteration as is the presence of the weed seed, and the result is many times just as serious. The carrying over of such diseases is all the more lamentable since the seed can be disinfected easily and cheaply. I refer to the formaldehyde method. The seed is sprinkled with a solution of one pint of formaldehyde to forty gallons of water, covered with sacks or burlap for two hours, and then raked out and allowed to dry. Every farmer should treat all unknown seed of oats and wheat, or all seed from a crop which was smutty or diseased.

A large number of inquiries are received every year concerning the possibilities and problems along the line of the cultivation of medicinal plants, and the past year has been no exception. Historically, the cultivation of such plants is really one of the oldest agricultural industries in the United States, and yet the progress has been very slow indeed. Fortunately there has been some experimental work and we are able to offer some suggestions. We perhaps have more inquiries concerning ginseng than any of the others. We have a circular (No. 28) from the State College which we furnish to all making inquiries along this line. We have also been making references to Bulletin No. 27, of the Pennsylvania State Board of Agriculture entitled "The Cultivation of American Ginseng in Pennsylvania," but I am not certain whether this is still available. In the past there have been two reasons why the cultivation of drug plants has been necessary (1) the growing scarcity of the wild sources of supply and (2) the possibility of improving the plants so that a more uniform and increased quantity of drugs may be produced. During the year the outbreak of the European war has cut off the foreign supply of many crude drugs and has forcibly brought to our attention the necessity for increasing our domestic supply. We are very much in need of further investigational work in order to take care properly of the inquiries and to encourage this industry in the way that its importance would warrant.

We are receiving also a steady stream of communications regarding mushrooms. Some of these refer to the edible or poisonous properties of wild forms and some refer to the cultivation of the common mushroom of the markets. We are doing everything to encourage a

proper and safe use of the wild mushroom crop. In addition to the identification of the specimens, we give out by letter many suggestions. It is our aim to have people learn and become acquainted with some good sorts and to have them leave all others alone. There is absolutely no test for determining the bad or undesirable sorts so that they can be cast out of a miscellaneous gathering. One should never eat any kind with which he is not familiar or which has not been identified by someone who knows. It is possible to learn to know the species just as one learns to know flowers or birds. A lumberman does not accept trees because they have certain characteristics, or reject others on such grounds, but he insists on knowing the kind of trees. This same thing must be insisted upon with regard to mushrooms. In certain parts of the State mushroom growing is an important industry. The people who are in the business frequently find their crops affected with pests and diseases. Many other people have heard of the possibilities along mushroom growing and are seeking information.

As in the matter of drug plant cultivation we are in need of more experimental work. In our own State we have no publication on the subject and can do no better than refer our correspondents to Farmers' Bulletin No. 204, United States Department of Agriculture.

Regarding the matter of plant diseases I will not have time to make more than a few brief references. Protection of crops from the ravages of parasitic diseases is one of our most important agricultural problems. The fundamental idea of the control of plant diseases is prevention. The practical work of prevention is based on facts mostly accumulated by patient scholarly investigating, experimenting, testing and improving. These investigations must continue. While it is important that demonstrations of known preventions be made, it is much more important that studies concerning causes be pushed vigorously and continuously. Our correspondence shows that there is a large demand for information along the line of crop protection. The members of this Board can do a great service by assisting to create public sentiment in favor of proper legislation for inspection, quarantine, and provision of funds for investigation.

A Member: Will spraying kill Canada thistle?

PROF. KERN: This as especially for wild garlic; it has been tried for some other weeds, but if you were willing to give up the field for a season I think it would be effective against Canada thistle, but it has not been tried so much for Canada thistle.

A Member: Can the field be used the next season?

PROF. KERN: Yes.

The CHAIRMAN: Gentlemen, you have heard the report; what is your pleasure?

A Member: I move that it be accepted and placed on file.

MR. HUTCHISON: The gentleman referred to a law that the Secretary enforces on the question of poor seed. I believe Mr. Kel-

logg will have a microscopic report that will take up that question and show what we found. I would like you, if you could, to attend when that report is given. It has been quite a field of investigation, and I would bring the information to you now under this report, but I feel that it might trespass on the Chemist's part of it. If he does not cover the field showing what condition we found the seed in, and so forth, at that time, I will make a reference to it.

The motion to accept the report was adopted.

MR. LOHR: I find on the program a period for the discussion of this report. Am I in order in asking further information in regard to this report.

The CHAIRMAN: Every report that is read here, is the subject of discussion by the State Board. There seems to be very little disposition this morning among the members to discuss these reports; this report we have just read is open to discussion. We must have that report right, of course.

A Member: I find a period of 15 minutes for the discussion of each report and I would like a little further information.

The CHAIRMAN: We have asked for discussion right along but did not get it.

A Member: Am I in order to ask the necessary questions?

The CHAIRMAN: Certainly, you are.

A Member: I would like to ask whether this compound offered for sale by the Standard Oil Company—whether the experiments have gone far enough to warrant the giving up of the field for one year, feeling that if you did so you would kill the Canada thistle?

PROF. KERN: No, I referred to wild garlic.

A Member: Is there anything made that would warrant the giving up of the field for one season, feeling sure that if you did so, you would get rid of Canada thistle?

PROF. KERN: I should say that it would depend on how bad the Canada thistle is. We receive a great many inquiries, but are unable to offer very intelligent suggestions in regard to the matter, for the reason that we do not have enough information. I have seen fields that, if you give the field up for a year, it would be sufficiently long to get the matter under control. But in many instances I believe that individual treatment with some chemical, for instance carbolic acid with a large oil can, cutting off the plants and treating them that way and smothering them will get rid of them.

MR. HUTCHISON: Wouldn't it be as well to mow the plants off before they came to seed and keep weakening the plants? Wouldn't it be an awful job to go over a field with some kind of acid spraying Canada thistle where it has a great hold?

PROF. KERN: Well, it would if it was as bad as that.

MRS. FOULKE: Can you do it with a spray?

PROF. KERN: Yes, madam.

MRS. FOULKE: How many times would you have to apply the spray?

PROF. KERN: You must understand that we have not tried this with regard to Canada thistle, but we have tried it with regard to garlic.

MRS. FOULKE: And how often would it have to be used for garlic?

PROF. KERN: About twice before the garlic thins out.

MR. J. ALDUS HERR: I would say in connection with Canada thistle in our county, we are getting pretty well polluted. Originally we hadn't many. A neighbor of mine had a field of ten acres covered with Canada thistle, and some years ago took the fences away and ploughed it about every ten days during the entire season and killed it by virtually cutting the leaves off every time it came up. On my own farm I have not had it for a number of years, and I am positive that I got it in grass seeds. I have one spot that a year ago happened to be in tobacco. We cut it off repeatedly and that ended the Canada thistle in that spot. But when I come in contact with a spot in a grass field that lasts over one year it is almost impossible, but if I have it in a cultivated field and go after it persistently and cut it off frequently, you will have no Canada thistle in that spot because it breeds through the leaves and cannot live without leaves. If you cut it off frequently in a field that is cultivated, you will kill it, but it is a pretty big job, there is no doubt about that.

A Member: If you put salt on it and let the sheep run in that field and nowhere else for two years, they will kill it without any trouble.

MR. J. ALDUS HERR: I agree with the gentleman right here, but how about it when you have no sheep?

MR. HUTCHISON: I had a field of six acres that was polluted with it, and I got my man to put it in buckwheat and sow it very thick and I declare I hunted there and only found two stalks; last year I sowed it in grass. That buckwheat seemed to smother it out and I do believe that buckwheat will go further to clean it up than any other crop you can put with it. Oh, it's an awful curse in this State. In Col. Woodward's county, on that good limestone land, it takes hold of the very best; it loves limestone land, loves to grow where the land is good and it is a great fight in this State against it. I believe, from my experience, that buckwheat—we don't raise buckwheat, we leave that to Clearfield county and counties that are not so good, but from my experience, buckwheat has helped us out.

MR. TAYLOR (of Lycoming county): I never saw it smothered out with buckwheat, but I have eradicated it by continued cutting. Take it in patches, as the gentleman has said, where you can get at it

and mow it continually, you are bound to get rid of it; it cannot live when it has got no leaves to breathe through.

MR. W. C. BLACK: I live in Mercer county, we think that Canada thistle is rather a blessing in disguise compared with another weed we have, the horse nettle.

PROF. KERN: That is a very bad weed and for the same reason the Canada thistle is a bad weed. It has numerous roots that go way down into the ground, and even though you keep cutting it off, it keeps coming back, and if you keep plowing the land the root stocks keep breaking up and may start new plants. I would suggest a mechanical explanation why you can kill any weed or any plant by keeping it cut down; it is simply this, that the plant must have green leaves above the ground for a certain length of time or it cannot live, because it gets out of the air the oxide with which it makes carbohydrates, and it gets out of the soil for that original product only the water, and then it gets nitrate and other things that the plants need. But if you can keep the leaves down so that the plant cannot breathe, as you say, you can kill any plant by such a method as that, so that you cannot over emphasize the matter of keeping plants cut down. In connection with Canada thistle, it is not for the reason that we don't want them to go to seed, because they don't go to seed here anyway; we do introduce them by means of seed, but that is from a seed that comes from further north. I don't think they seed in our region at all, at least very rarely.

MR. FENSTERMACHER: We have found a profitable way of keeping the Canada thistle under control and even eradicating it. Wherever I grow alfalfa and have Canada thistle, put out a good seeding of alfalfa and they gradually get less and you can raise good crops of alfalfa at the same time.

MR. M. M. NAGINEY: Our method of eradicating the Canada thistle is to wait until they come into full bloom and then cut them all off and they will bloom a couple of times in the season and we cut them off again and in two years we have been able to eradicate some very bad patches in our farm. I think the closer we keep them howed or mowed, the sooner we can eradicate them.

MR. DE WITT: If I had the time to live I have spent at digging Canada thistle in Tioga county, I believe I would be quite well satisfied, and it is all useless, in my judgment to bother with them. In our county they have got sick and tired of trying to exist and we have not near as many up there now as we had 25 years ago, and the people have not paid hardly any attention in trying to eradicate them; but we have something just as much worse than the Canada thistle, and that is the paint-brush. Perhaps that has not got into eastern counties yet, but when you have got the paint-brush, you have got something you can begin to worry about. We call it the Potter County Brush, because there is where it was first seen among our people in Tioga county, and we claim that the seed was drifted through there by the winds, and it is the worst plant that grows. If any of you have ever seen it grow—it will grow right up and come right out like that and there is a little

posey on the end of it and it shades the ground so that it can cover everything completely and there won't anything eat it.

I don't know what we are going to do in Tioga county. I was through a section there last summer where there were whole fields of it, acres of it. It is very pretty to look at it when it is in bloom; it is as red as a cherry, but there can't a single thing grow where that grows. That is the thing that confronts our farmers in our county. We used to be bothered with a weed called "live-forever" up there; but a gentleman got what he called diseased live-forever and planted it and we have not any of it now. If we can find something of that nature to put in Canada thistle fields and the paint brush fields, we will solve the problem of getting rid of them. I got barrels of salt and tried to kill out the paint brush but it is useless. I took my hoe, and was not satisfied with the hoe, but carried a sack of salt on my side and salted the roots of it and I might just as well have been counting my beads or saying my prayers for it did not do a bit of good.

PROF. KERN: I would like to say if some of the gentlemen who live in these regions where they have these bad pests will kindly take up this matter with me by letter, I will arrange to do some experimental work in their regions, provided they will co-operate with me, and I am sure that some of these things can be conquered in a very short space of time and will make good demonstrations for the people in these vicinities.

A Member: Canada thistle has been eradicated in our county by continued cutting and we are not bothered with it.

MR. PERHAM: I used salt for years and gave it up, but I have noticed in the last few years some of the fields that were most badly infected with it—it seems to be passing away; whether it has got diseased, live-forever, I don't know, but I know that some of the fields where nothing else grow, it seems to be gradually leaving. My impression is that it has got some disease or something that is wiping it out in those places; at least I hope so.

MR. BILLINGS: Isn't there a parasite on Canada thistle? If there is, cannot it be assisted in any way? Now, as has been stated here, the Canada thistle is not nearly as bad with us as it was 20 or 25 years ago. In a cultivated field, with three or four years rotation, we have no trouble with the Canada thistle and much less in our pasture fields, where it was thick 20 or 25 years ago.

MR. JOEL A. HERR: I am rather discouraged in trying to urge the farmers to kill these hardly plants that are very difficult to kill, when they will let their fields be overgrown with something that is easy to kill and just as noxious as the other. I traveled over five counties of this Commonwealth in the matter of sampling fertilizers, and I want to tell you that the whole country is being spread over with these wild carrots. It is a terrible curse, it is not quite so bad just now in our immediate neighborhood. In some of the counties I traversed, particularly Columbia and a good deal of Montour, Lycoming and Clinton counties, the wild carrots cover the field like a field of buckwheat. Now that is a plant that is easily

destroyed, and if you cannot get the farmers to destroy that and they will let their fields grow all over with it, how can you hope to have them dig out or kill Canada thistle that requires several applications? You may kill the Canada thistle as I have often done and not see it for a year or two, and then after a while you have got it in again, but I am down on wild carrots, I think it is inexcusable that any man will allow his fields to grow up with wild carrots. In Columbia county there are a few exceptions. My friend, A. P. Young here, who represents that county in this Board, has a farm that perhaps is entirely clear of it and William T. Creasy has another, but they are exceptions, they are not the rule.

MR. WILSON: My plan of killing the Canada thistle is to make the spot of ground the best in the field, fertilize it, lime it and sow clover on it, and in the next year or two you will have no Canada thistle on that spot. Mammoth clover will smother them out if nothing else will. It is easily done and a sure way to kill it.

J. MILES DERR: Last year I was in several barns where Canada thistle blew over the barn, where they used the blower and the logs and rafters and everything was covered with it so that the men were hardly able to work on account of it, and above five-sixths of the farms in our locality are operated by renters and they pay no attention whatever to trying to eradicate the weeds. They allow them to grow and claim that they are not propagated by the seeds, don't grow from the seeds. The cultivated fields are getting worse from them each year; there are acres and acres in almost every field in the neighborhood, and we have as rich a valley as any in the State. I know farms in our valley last year, every one, that blew Canada thistle around by the bushel and the manure is certainly alive with it this year.

MR. BOWER: We are not bothered very much in our country. I find the most effective remedy I have applied is pomace from the cider press. A load of apple pomace will kill out any Canada thistle or paint brush. Yes, it will kill the paint brush and then you can raise another crop next year.

The CHAIRMAN: Now, gentlemen, this matter has been pretty thoroughly discussed. We have consumed the time that has been allotted and will call for the report of the Pomologist, Mr. Chester J. Tyson, of Floradale, Pa., and the discussion of this report we can take up first thing after dinner.

MR. TYSON: Mr. Chairman and Members of the Board: In making my report, I realize that in following the report of your Committee on Fruit and Fruit Culture, what I have to say may seem like the report of a pessimist, and I will simply have to fall back on those of you here who know me in backing me up that that is not my nature. What I have to say I say because I feel that they are questions that we should consider most carefully.

Mr. Tyson then presented the following report:

REPORT OF POMOLOGIST

By CHESTER J. TYSON

Another year has gone by since our last report. For the past month or two, various organizations of apple growers have been holding their annual meetings. In looking over the programs of these meetings, one is impressed with the fact that more and more attention is being paid to the business end of apple growing. This does not mean that all the problems of production have been solved; but it does point to the fact that the difficulty of selling the abundant crop already produced is in nearly every mind.

The year 1914 has been a hard year for apple growers. There have been occasional hard years in the past, and there may be many more of them in store for us. There is one encouraging side to such lean years. They may discourage some people from planting trees who have been carried away by the glamour given the business by some magazines and a few, so-called, farm papers. Taken as a whole, Pennsylvania had nearly double as many apples as in 1913. The crop was very well distributed and very few real crop failures have been heard from. The latter half of the season was severely dry in most sections, and this fact, coupled with over-full trees, has resulted in smaller than average fruit. Serious damage from hail has been reported in several places, and serves to remind us that after we have done everything we can to produce good fruit, we are still subject to the whims of Nature.

Among the serious orchard pests of which we hear most this year, are green and rosy apple aphis, canker worms, sooty blotch and pear blight, particularly that form affecting the trunk, near the crown. Marketing conditions, except for early fruit, have not been right.

The usual apple buyers were noticeably absent during the Fall, and very much more than usual of the apple crop went into storage, owned by the grower. Two causes entered into this condition; many buyers were fearful of the future, and those who would have bought, found that the banks were not willing to back them. Market conditions picked up somewhat in December and large stocks of apples were moved then, but the holiday season was dull and conditions have grown worse rather than better since that time. Tremendous stocks of fruit are still held in storage, particularly New York, Baldwins and boxed apples from the north and west. Both of these classes of fruit are selling already at prices that cannot show profit to the grower. Baldwins at $1.75 per barrel, with 87 cents charges; large western Staymans and Rome Beauty at $1.25 per box, with 82 cents charges, hardly can pay the cost of production.

Three prime causes have entered into this condition. First, the crop has been more than liberal throughout the whole country, with a few minor exceptions, more than one-half greater than 1913, and even a little more than the heavy crop of 1912. Second, the war in Europe, both directly by cutting off exports to Germany, and in-

directly, by taking so many vessels out of trade that shipping facilities to England are unusually poor, has seriously crippled foreign trade in apples. To be sure, a good many apples have gone to London, Liverpool and Glasgow and have brought fair prices there, but only limited space has been available on refrigerator steamers and ordinary space has proven very unsafe for apples, for they have both frozen and overheated while crossing. So while the prices reported from the other side have been fair, some of the net returns have been very disappointing. Third, it is very doubtful whether the large crop and the loss of export trade combined would have had such serious results if our own country's industries had been going full blast, all hands working full time with lots of money to spend. Some of these things are beyond our control, but I have felt that a survey of them was worth while at this time, in the light of a few things we can do to help the future of the apple industry.

Here are a few points that need most careful consideration. We are right now facing the results of "over planting," all of which we have been talking for years. To what extent are we, each one of us, responsible for this over production? Have we spoken conservatively of our business when asked, or have we gone about boasting of the splendid returns and the ease with which we have secured them? It is an absolute fact that thousand of men have planted hundreds of thousands of fruit trees for the one reason that they have been unintentionally deceived as to the golden harvest to be reaped. Some of these trees will die of neglect, some of them have died. Many of them are alive and bearing fruit. Let us take this lesson seriously to ourselves. If we speak of returns, make sure that we speak in terms of net, not gross, amounts. Imagine if you can, a manufacturer of silks, shoes or automobiles, boasting of the profits of his business to the end that his hearers will wish to become his competitors. The cases are nearly parallel.

And this leads us to my second point. What do we know about cost of production? How many of us know what a bushel of apples really does cost. How long would a large manufacturing enterprise continue to live under severe competition without rigidly figuring all costs? In the season just passed, competition has been keen, business conditions have been dull, and unless we have learned to figure down the cost, we have lost money.

My third point has to do with an entirely different matter, and yet it may touch us as closely as either of these. This seems to be the age of legislation. Our legislative mills grind out a never-ending grist of laws—some good, some bad—but we must be governed by them. Good laws can help our business; bad laws can put us out of business. Let us stand firmly for the passage of laws which are just and fair to all. A fruit grading and branding bill will be offered in the present legislature. Let us see that this bill is shaped to meet the needs of our fruit growers. Amendments will be offered to the weights and measures act of 1913 session. Let us see that these amendments really improve the act, then get behind them in no uncertain way. It is manifestly unfair to demand in any law that a definite weight be given for a standard bushel of apples. Bulk for bulk, apples will vary nearly ten pounds to the bushel, depending on varieties and stage of ripeness. All of these things point to the real

business end of our business and carry out the thought with which I opened this report.

The CHAIRMAN: Now, gentlemen, this report is open for discussion.

MR. HUTCHISON: There is a very important suggestion in that report, and that is in regard to weights and measures. No man stands for honesty more than I do, that a man should give the full amount; but when it comes to a matter of apples, I have heard more complaint over this State in regard to weights and measures than any other thing that was done there along that line two years ago. Now, as the brother brought it out here he says, "Get back of it," and I do belive that that portion of this report should be referred to the Legislative Committee, and I so move that the portion of the report referring to the weight of a bushel of apples be referred to our Legislative Committee for action.

Motion seconded.

The CHAIRMAN: Gentlemen, you have heard the motion that that portion of the report relating to the weights of apples be referred to the Legislative Committee. Is there any discussion?

MR. LOHR: As a member of the Legislative Committee, I would like to have some suggestions from the various members as to what their opinion is in reference to what remedy should be applied or what steps should be taken to remedy this defect. I realize myself that this law has been very objectionable in many respects especially with regard to the weights of apples. There are probably some members here who are better acquainted with what should be the standard weight of apples than many of us who are members of the Legislative Committee are, and I think a little discussion along that line would be of help to us.

The CHAIRMAN: That would be a matter to come up before the Legislative Committee.

MR. BLYHOLDER: I should like to ask Mr. Tyson's opinion as to the weight of apples or how a sliding scale could be fixed for various kinds of apples or their condition in the different seasons?

MR. TYSON: It seems to me that even by adopting a sliding scale for apples we would be getting into something that would be too deep for us. Just as is suggested in that paper, apples of different varieties vary exceedingly in their weight, and apples of the same variety vary in their weight with changing conditions of ripeness. It seems to me that they only just and proper stand for apples is the standard of measure. I thoroughly agree with the idea of adopting standards by which consumers may know what they are getting and be sure that they are getting full measure; but it seems to me that the only safe way and the only way that ever will be satisfactory will be for us to adopt standards of measure rather than of weight for products of this kind. The bushel usually suggested and one that has been seriously considered in our National Congress is based first on the Winchester bushel of 2,150 cubic inches, with a crown of about

4 inches, which makes a bushel of about 2,300 cubic inches. That is the measure of apples that has been considered in Legislature. It constitutes one third of the national standard barrel of 7,056 cubic inches. It seems to me that is the only way for us to legislate.

MR. FENSTERMACHER: The same thing will apply to potatoes. No bushel of potatoes will weigh 60 pounds at this time of year and the size has something to do with the weight and the same is true of other vegetables. A member of the House from our section has in mind bringing it up before the Committee of the House, and I was surprised, he is a market gardener, and I was surprised to see how much in error this progressive bill is in weights as he has found it along the entire line; the fact is the bill is a haphazard affair, just thrown together and don't suit anybody and he emphatically demanded to have the thing changed.

MR. J. ALDUS HERR: I would like to corroborate a little what Mr. Fenstermacher says. In our county we are growing a good many potatoes. The buyer, when he comes there, insists on 60 pounds to a bushel and won't buy them any other way. Does the buyer or the commission man, when he sells those potatoes, give 60 pounds to the bushel to the consumer?

The CHAIRMAN: The law says he shall.

MR. J. ALDUS HERR: But does he do it? That is another proposition. We all know there is a very short time during the season that you can put 60 pounds of potatoes on a bushel measure, because, as they shrink a little or the moisture evaporates, you cannot get 60 pounds of potatoes on two half bushels.

MR. JOHN SMITH: I would like to emphasize that fact: I belong to the market gardeners and we find everywhere we go the same trouble, they want everything weighed or else we have to call it T measure. In marking strawberries this year, some of the men in buying strawberries wholesale would buy two regular standard quarts and take them into their store where they had the short measures and would dump the two baskets in the measure and make three quarts and sell them maybe a cent or two below, and the consumers thought they were buying full quarts, and the man who has charge of that will come around and if he finds them marked quarts, he will jerk them up and if they are not marked quarts he will let them go, and it is the same way with selling by peach measure. They did away with these old pecks and sell by the new pecks, but it will not hold fifteen pounds of potatoes. The only way we can get away with that is by calling then simply measures, instead of quarts or pecks. The Frick people buy all their potatoes by the pound. We cannot very well carry a scale around for weighing of the articles we come across but we would have to do it under this new law.

MR. BIDDLE: We all know it to be a fact that when an apple is picked it is heavier than after it is ripened, and you take the apples and put them on the market at the present time and I doubt whether there's any variety that will hold out in weight, and especially the larger varieties. You take the thin skinned apples and it will evap-

orate more rapidly than some of the thicker skinned apples, and the apple grower is losing and I believe that we ought to adopt some plan and that the legislature ought to adopt some way whereby we can sell our apples and fruit by measure in place of by weight. I believe it would be a good thing if that legislative committee would get together and adopt some scale, some measure, some way by which we could sell that stuff by measure instead of by weight and I believe Mr. Tyson would be the very man to head that committee.

The SECRETARY: I would suggest that it would be a very good thing for the Board to have a resolution prepared to be presented to the Committee on Resolutions so that it will come in for discussion at the proper time and then the Legislative Committee will know exactly what the will of the Board is after that resolution is adopted. My thought is that it would be a good thing to put ourselves on record as being opposed to any attempt to standardize fruits and certain vegetables, if not all vegetables.

Now there just comes to my mind the question, Is the bean a vegetable or is it not? Let that matter come up in the form of a resolution later in the session to be referred to the Committee on Resolutions when it will be reported upon and then the Legislative Committee will know exactly what this Board thinks about this important question.

MRS. FOULKE: I look at it a good deal from the housekeeper's point of view. If you buy a quart of onions, you get about six; if you bought a pound, you would probably get seven, so I think there is another side to it. We ought to make our measures a little bigger, because it is going to hit the housekeeper pretty hard.

The SECRETARY: But we must take care of the farmer; the farmer's wife keeps house right at home with him.

MR. FENSTERMACHER: In California all these things are bought and sold by the hundred pound weight, even eggs. If everything was sold by weight, there would be no trouble, and I think the weight would be satisfactory to everybody.

MRS. FOULKE: That's the way it ought to be.

The CHAIRMAN: Gentlemen, you have heard the motion before the house; those in favor will signify by saying Aye. Those opposed No.

The motion was carried.

The CHAIRMAN: Is Col. Woodward, of the Memorial Committee here?

MR. HUTCHISON: He just went out the door. He said he would be ready to report at the proper time.

The SECRETARY: Col. Woodward said to me as he walked down the aisle a little while ago that he thought his Committee was appointed to report simply upon the death of Gen. Beaver. My understanding was that that Committee was to make the Memorial Report—any report of that nature that there is to be made, and I think I am right.

The CHAIRMAN: I think the Colonel was put on that Committee on account of his knowing Gen. Beaver so well; but that Committee as I understand it, was to report on any memorial.

The SECRETARY: I want to advise, therefore, that any of you who know of any members of the Board or any person to whom reference should be made in that report, speak to Col. Woodward as soon as you can so that he will have an opportunity to say something in relation to the parties you name to him.

MR. KERRICK: I am on the Committee with Mr. Woodward and understood that we were only to report on that one matter, the death of General Beaver, and I would rather you would appoint another committee.

The SECRETARY: That you were only to report that one resolution?

MR. KERRICK: That's all.

The SECRETARY: It is not so recorded.

MR. BLYHOLDER: I move that the Committee be instructed to take up all the memorials.

MR. FENSTERMACHER: I have no objection provided we are given data and facts to work on, as to who has died.

The CHAIRMAN: You were appointed to report at this meeting of the State Board.

MR. KERRICK: We can report at the close of the meeting on Thursday, can't we?

The CHAIRMAN: Yes sir.

The Board then adjourned until 1.30 P. M.

Tuesday Afternoon, January 26, 1915.

The State Board of Agriculture was called to order at 1.30 P. M., Vice President George in the Chair.

MR. DE WITT: I am pleased to state that we have with us this afternoon from Tioga county one of our representatives and one of our county commissioners, and I move that they be privileged to take part in the discussions this afternoon.

The motion was seconded and adopted.

The CHAIRMAN: Will Mr. De Witt please give the names of those gentlemen?

MR. DE WITT: The name of the representative is Frank Marvin and the County Commissioner, R. E. Cleveland.

The CHAIRMAN: First on the program this afternoon is the report of the Chemist, Dr. William Frear, of State College, Pennsylvania.

Dr. Frear then presented the following paper:

REPORT OF THE CHEMIST

By DR. WILLIAM FREAR.

THE POTASH QUESTION.

The farmers, truckers, orchardists and florists of Pennsylvania have come to use very large quantities of commercial fertilizer. The cultivated areas of the State are being more intensively farmed, so that, although the expansion of cities and towns, the outward movement of industrial plants, and the abandonment of occasional outlying farm enterprises near lumbering operation, when the timber has been cut off and worked up, have very slightly reduced our farm acreage during the past decade, the demand for fertilizing materials has increased. Our systems of animal husbandry are also undergoing a very considerable change. The pasture is being used less, the barn more, and new manure saving devices are more generally used. That means more manure, to the head of the livestock kept, that is available for plow land. On the other hand our numbers of livestock are decreasing, not only relatively to our increasing population, but absolutely.

For fifty years, manure has been more and more substituted by commercial plant foods. The possibility of such substitution together with labor scarcity, and the increasing uncertainty of direct profit in the finishing of beef cattle, has doubtless had much to do with the gradual decrease in farm animals as compared with the total farm areas. In many cases, the system of farm management is such as to place only a minor dependence upon stable manure and to use commercial fertilizers as the direct manurial supply for half or more of the crops. That is one of the reasons why our annual bill for commercial fertilizers is running up from seven to eight millions of dollars a year; and also why we look with concern upon any change in economic conditions that seriously affects any part of the fertilizer supply. Time was when besides manure, the more soluble part of which carries a relatively good proportion of potash, wood ashes gave us about the only other supply. But now, we burn coal, instead of wood, and that domestic supply has all but disappeared. Cottonseed hull ashes became somewhat prominent, but the New England tobacco growers took all that the South would sell.

Practically all the potash in our fertilizers has, for years, been the product of the governmentally controlled German potash mines. We may approximate the quantity of these salts consumed in Pennsylvania on the basis of our annual fertilizer tonnage reports to the State Department of Agriculture and of the average composition of the several classes of mixed fertilizers analyzed. These figures, for

1913, together with those for potash salts sold unmixed to the consumer, are equivalent to 30,771 tons of high grade salts, together with 3,362 tons of kainit sold as such. Of course, it is not meant that the potash of mixed fertilizers all comes from high grade salts. Much of it doubtless was introduced in kainit and other lower grade products. These figures represent 14,300 pounds of actual potash. The potash salt imports such as are used in fertilizer manufacture were, in 1913-1914 equivalent to 250,000 tons of actual potash. From which it follows that we use one-twentieth of the total import.

The war, when it broke out, found most of our manufacturers quite well stock with potash salts, but the problem for the future was dark and difficult. The call to arms had, according to credible information, cut down the producing capacity of the potash works to one-half the normal. Germany had always used herself a large fraction of the output. Her supervision of agriculture was as much a part of her war plans as that over her arms factories and transportation facilities. With the growing prospect of a long war ahead of her, it was uncertain how much of her diminished product she would reserve to insure her food supplies for the coming year. Although England declared no blockade, her dominant fleet cut down ocean transportation, the use of mines increased carriage risks and ocean insurance and freight rates went up correspondingly. To meet this situation the principal fertilizer manufacturers decided to eke out the potash supplies in hand, and to do it by cutting off the direct sale of potash salts to the consumer, and by making no fertilizer that contained more than 3.5% of potash. In latter August, September and October, sales of potash salts were here and there reported at prices of $100 to $120 a ton for muriate. Many of the manufacturers remixed the goods already put up for the market, though the time of contract delivery as only two or three weeks distant. The Department required proper notice to the consumer of all cases in which, in consequence of this conservative policy, the potash supply in the goods was reduced below the previous guaranty of the brand in question.

The net result of these conditions was not a large number of modified guaranties, but a very marked reduction in the number of brands offered for sale. The average richness in potash of the complete and rock-and-potash fertilizers examined in the Fall of 1914 was about 1% less than for the Fall of 1913. Because of the sale of Spring stocks and the failure to remix in all cases, the average potash richness of these two classes of goods was considerably above the 3.5% maximum fixed by the manufacturers; but there were few samples found of potash salts on sale. By the first of August much, of course, of the Fall buying by consumers had been contracted. The selling prices show no increase in cost to the consumer of the potash he bought last Fall.

What, however, of the coming year? These long nights, when angelic dreams of $2.00 wheat and maybe $1.00 corn bless the farmer's bed, it is joy-destroying to have a spectre of potash famine appear in the near background—a real spectre such as the news might well create, that, in October, our imports of muriate and sulphate of potash were only 600 tons, as contrasted with 17,000 tons in October, 1913; of manure salts, 1,225 tons vs. 18,416 tons; and of

kainit none vs. 56,000 tons in 1913. In December, Atlanta, Baltimore and New York talked about $73 to $75 a ton for muriate, but there was not much to sell. Arrivals in port were few and small. But the week ending January 15th of 3,020 tons of muriate, 685 tons of sulphate, 693 tons of manure salts and 50 tons of kainit were received in New York from Rotterdam chiefly consigned for the most part directly to fertilizer manufacturers, besides other receipts in other ports, and the consideration that the manufacturers by diminishing Fall deliveries were enabled to carry over some of last year's stock for this year's use, ought at least to soften some of the potash famine spectre's alarming effects.

But at the best there must be a great shortage. A 3% maximum for potash is now the line fixed. Still, our new supplies of potash salts probably cost our manufacturers more a ton, and we may expect to give them some of the hoped profit on the wheat we have held for the highest price; and we may well ask how we can economize on potash use. By no means try to economize by buying worthless or very poor substitutes. There couldn't be a better time to push the sales of powered feldspar, phonolith, and stone meal fertilizers. But even now is not a good time to buy them. They probably do the plants a little good, but not enough to put back into your pocket the dollars you spend for them. It would be a good time to develop, if we could, our own potash supplies. The government is hunting for concentrated deposits like those at Stessforth, Germany, but has yet found nothing enough like them to pay working. We are assured that the kelp drifting upon the Pacific Ocean contains enough potash to furnish our supply; but we are not told that it can be furnished at ruling prices.

Some of our ablest capitalists and chemical experts are studying earnestly the possibilities of chemical conversion of the potash locked up in feldspar, aluminite and similar minerals, but have not yet found a way to do it to economic advantage. It is, however, an excellent time better to save your liquid manure, and to get your manure more evenly distributed in the field, and used where it will count most in cash returns; and it is a very good season to use the best seed, and to cultivate thoroughly and at the right time. It is worth while, also, to ask whether you have been getting back all the money you have spent on potash for your general farm crops—I am not talking especially about potatoes, truck and tobacco, but of grains, grasses and even fruits. Of the various Eastern soils upon which field experiments with fertilizers have been made, comparatively few show potash as the food element chiefly efficient for the common rotation crops. Usually rock and potash gives a better yield of these soils than does acid phosphate alone. But very, very often the extra gain is not enough to pay for the potash.

Remember, I believe in potash fertilizing, but I believe also in good judgment in using this aid. So I do not believe in the economy of buying low-grade fertilizers; but also, I do not believe that potash-rich fertilizers are needed for every crop. Perhaps, too, we can use something else with the potash that will make a pound of the potash do more work. The Rhode Island experiments conducted for years on their acid granitic soil, previously limed, showed that sodium salts, sulphate and common salt, helped out the potash. They

couldn't do all the work it did, but apparently they would do part of it. Also, if we have been putting on dressings of potash for years, has it all gone off in our crops and drainage? By no means. It doesn't leach out easily from loams and clays. Most of what the crop doesn't get, stays in the surface layer of such soils, and remains there, at least a large fraction of it, if we may judge by Rothemstead's experience, in a very fair state of availability. If the plant cannot get it out, sulphate of soda, nitrate of soda, sulphate of magnesia, land plaster or common salt may assist. On acid lands, however, I would commend liming with the sulphate of magnesia. Lime itself, magnesian or non-magnesian, will help to liberate this potash, but neither the caustic lime nor crushed limestone is as efficient for this purpose as the salts above named. The coming year may give the American farmer a good excuse for climbing out of his fertilizer rut, and trying in practice more of what his experiment stations and those of other countries have been discovering for him.

The CHAIRMAN: Gentlemen, you have heard this report; what is the will of the Board?

Mr. GLOVER: I move that the report be received and printed in the proceedings.

Motion seconded.

MR. SHROAT: Can you give us more definite information as to the kelp on the Pacific Coast and whether it can be profitably used in the years to come?

DR. FREAR: There was no proof that this kelp can be gathered dry-burned, and that is what they propose to do to get out the potash and handle it so as to supply us that potash at a cost compared with that which we have been ordinarily paying for German potash salt. There is a good deal of material there, but if you could see the great masses of this kelp in strings 20, 30 and 40 feet long, plastic material that gets all tangled up so that it is hard to pull it apart even by hand—I have tried it—you would understand the mechanical difficulties and the necessary cost in having this source of supply.

MR. SHROAT: Then you think the American farmer need not look to kelp for a supply of potash for years to come?

DR. FREAR: Not for some time to come, no.

The CHAIRMAN: Are there any other remarks? If not, are you ready for the question?

The motion to receive the report was then adopted.

The CHAIRMAN: It is past the time for the discussion of this report now; is Dr. Marshall in the house? If not, we will take up the next topic on the program, which is the report of Dr. M. E. Conard, on Dairy and Dairy Products.

DR. CONARD: My reports is short. In traveling over the State, in order to make a report, I feel that if I really did it justice and criticized as I went along, you would think there was no dairy busi-

ness left because of the great shortage we are suffering from now, both in number of cattle and in the necessary product that they should have.

Dr. Conard then presented the following report:

REPORT OF COMMITTEE ON DAIRY AND DAIRY PRODUCTS

By DR. M. E. CONARD, *Chairman*.

In reporting the condition of dairy and dairy products in Pennsylvania, at this time, I find it difficult to obtain definite data, that will give a correct idea of statistical conditions. The number of dairy cattle have been steadily decreasing for the past 15 years as a natural result of increased population, together with a supply of dairy cattle that were too cheap to be appreciated and properly cared for. It would seem that increased population and demand would stimulate production; but first the surplus beef, veal and milk had to be consumed, then increased production follows as a necessary result, and not until then. We have passed through this epoch and are now feeling the need of increasing our stock and output to meet the growing demand for human food.

We were, in 1910, nearly 400,000 cows short of 1900 census report, and had about 40% more mouths to feed; and we do not think the conditions are any better to-day as to numbers. A little calculation will show that if every available heifer calf should be raised to maturity, it would require nearly nine years to regain the numbers of dairy cows that existed in Pennsylvania in 1900, and yet no provision for the increased population. Isn't it time that something effective was being done to stimulate animal husbandry in Pennsylvania? We think so. We think the tide has turned and that there are more calves being raised the past two or three years, but not nearly so many as should be. We believe that not only the numbers but the efficiency of our dairy cows should be increased by more intelligent selection and raising of calves. The rapid advance in the price of dairy cows, we believe, is not a calamity but a blessing in disguise. It has the effect to stimulate the business dairyman to better and more thoughtful work, to make the average man better appreciate his cows and breed and select better stock, and it is to be hoped it will; and it evidently has put many of the shiftless farmers out of the dairy business.

I will not take time to discuss market conditions, amount of supplies, prices and the like, because I do not regard that to be the vital point in the dairy business at the present time. The intelligent business dairyman finds a reasonable profit in the present market and the man who is shiftless and disregards all modern and advanced dairy methods and sanitary requirements must do business at a loss, mend his ways, or get out of business. I feel that, facing a growing market, and for better and safer milk and butter to feed the rapidly increasing number of mouths, the vital question to be answered, and

to be answered quickly, is how are we going to meet this demand? How is Pennsylvania going to do her share and reap her proportion of the profits of this deal? It will be met and if we do not do it, some other territory will.

There is not an agricultural section in Pennsylvania where, with a little well directed intelligent effort, the amount of dairy products could not be doubled in three years and redoubled more easily in the following three years—and there are lots of people who are only waiting for the necessary information and proper encouragement to make the effort, but they do not know what they are waiting for. "Animal Husbandry" is a branch of agricultural instruction that has been sadly neglected amongst our Pennsylvania farmers and greatly to their disadvantage and loss. For want of just this class of instruction, the Pennsylvania farmers as a whole, I believe, have done more destructive than constructive breeding of livestock. The largest part of the livestock is managed by people who have never enjoyed the opportunities for obtaining such knowledge as is now obtainable and cannot avail themselves of present opportunities. They are generally people who cannot benefit by class work but must depend largely on object teaching—preferably at their own barns, thus getting the principle and its application both at the same time. It is difficult to teach a man facts through his imagination, who has always been accustomed to dealing with the stubborn visible facts. Now we feel that much of the future success of the dairy interest of Pennsylvania depends very largely upon the better distribution of knowledge pertaining to Animal Husbandry, so we urge that there be more effort made through all of the many teaching channels to impart a practical and appropriate knowledge of the better use of livestock on our farms. A better understanding of the advantages to be derived from the use of pure breed sires, what a pedigree and milk or butter record stand for, how to select a breed best suited to our local and climatic conditions, so as to get their maximum production, the kind of stabling, care and feed best suited to the breed selected. How to produce a better article and at a lower cost, and how to put it on the market in proper shape, then the demand and price will adjust itself.

I want to emphasize the importance of the proper selection of breeds for location. That is something that has been sadly neglected. I don't know that it has been taught very much. We have a widely diversified climate in Pennsylvania and in the eastern part, near Mason & Dixon's line, quite a mild winter. Go to the northern tier of counties and we have it pretty rough and pretty cold. There are breeds of cattle adapted to both of those conditions and it is important if we want the best results to get the right animals in the righ place. Pure breed dairy cattle are very artificial; they are the result I know, of man's ingenuity in the way of breeding and selecting and also climatic conditions where these breeds are created. Now when we take them out of those conditions and put them in reversed conditions, opposite conditions, the artificial features acquired which are the dairy features, will naturally be the first features to lop off or to be disposed of and a rapid degeneration goes on. We have not given that enough thought. We have a number of

good dairy breeds and from them every section of this State can be supplied with cattle that are well adapted to climatic conditions. A little bit more thought, a little bit more study along that line would avoid a great many failures.

The mixing of breeds is another thing that I think we do wrong, we mix the large and the small breeds, thinking that in one generation we can do what has been aimed at for hundred of years by getting a happy medium that would give a larger quantity of richer milk, or some feature of that kind. Now that is destructive breeding and not constructive. I thank you for your attention. I won't take any more time.

The CHAIRMAN: Gentlemen, you have heard this report; what action will you take?

MR. BIDDLE: I move that it be accepted and filed.

Motion seconded.

The SECRETARY: My thought is that the proper time for discussion on the motion is now, before you adopt the report. You might want to amend it in some way. Let the discussion proceed now, if there is to be any discussion, upon the motion to adopt the report and have printed with the proceedings.

The CHAIRMAN: Are there any remarks or discussions on this subject before the motion is put? If not, are you ready for the question?

The motion was then adopted.

MR. BIDDLE: I believe the record should be made that the report was accepted in place of being received. When we receive a report it does not accept the thought of the men that give the report. When we accept it, we accept their thought.

The SECRETARY: I don't remember what I said just now, but I probably expressed my own conception, that we receive a report from the hands of the committee and then the committee is supposed to have discharged its duty. When the motion is to adopt the report, by action of the Board, if it is favorable to the adoption, we make that report ours and stand for what it contains. This motion, I take it, was intended to be that the report be adopted and printed with the proceedings of the meeting; is that it?

MR. BIDDLE: That is it.

The CHAIRMAN: I see that Dr. Marshall has come in since this report has been read. We are now ready for his report.

Dr. Marshall then presented the following report:

REPORT OF VETERINARIAN

By DR. C. J. MARSHALL

With the exception of the recent outbreak of foot-and-mouth-disease, there is nothing new or unusual for the State Veterinarian to report to the Board of Agriculture for the past year. This disease will be considered at a later meeting. The ordinary diseases that are present and rather common in Pennsylvania at all times are tuberculosis, glanders, hog cholera, rabies, contagious abortion, calf sours and joint evil. The losses from these diseases each year are far too great. Much better results may be expected when there is a more united effort put forth to stamp them out. We have made progress in recent years handling glanders and hog cholera. There has been no remedy discovered yet that will cure either disease. In glanders our progress has been made in the improved methods for diagnosis, while in hog cholera it has been in the vaccination for prevention. In former times glanders was recognized in horses only when the disease was far advanced. Before this stage was reached the glandered animal may have passed the infection on to man, horses, and mules, which may have died from it before the symptoms had attracted attention in the horse that gave the infection. Later the mallein test came into use. This test was somewhat similar to the tuberculin test for tuberculosis, but much less reliable and mistakes were often made. In some cases healthy horses were condemned and destroyed by its use and in others the test failed to reveal the presence of the disease.

For the past few years we have been using a combination test for glanders that is reliable in practically every case. These tests are made jointly in the stable and laboratory. A special proparation of mallein is dropped in the suspected horse's eye; at the same time a sample of blood is taken from the jugular vein for laboratory examination. If the animal has glanders the eye becomes inflamed in about 12 hours and clears up fully, during the next 24 hours. If the horse is free from glanders, the eye remains clear. The blood examination serves as a check on the eye test. Both of these tests are extremely delicate and often will reveal the presence of glanders in a horse perhaps a year or more before there is a discharge from the nose, an open sore on the body or any other observable sympton. Such an animal is often a greater source of danger than one in the last stages of the disease for the reason that no precautions are taken in the first instance and reasonably safe measures are practiced with the horse with the open lesions.

Where an open case of glanders is found in a stable, it is promptly destroyed and all other susceptible animals are given the eye and blood tests. In some cases from two to twenty per cent. of the non-suspected horses fail to pass these tests. A careful physical examination may show no suspicious symptoms even to one thoroughly trained in the diseases of animals, yet the State recommends that they should be destroyed at once. They are appraised at their ac-

tual value and destroyed but the State cannot pay more than two thirds or $60. An autopsy is then made to see if the condemnation was justified. About 300 such autopsies have been made and no mistakes have been found. It is often difficult to convince the owner that his horse has glanders when it is perfectly healthy, so far as anybody can see. The State could safely pay an owner full value in every case where a mistake is made. The owner would be more easily convinced at times if the State could pay him full value if a mistake should be made. Glanders is seldom seen in the rural section of the State. It is much less common now than in previous years in the large cities and should be exterminated entirely. This could be done rather easily if we were not compelled to purchase horses from other states. It was considered wise to close the public drinking fountains in Philadelphia during the past summer to prevent the further spread of what promised to be rather a large outbreak of glanders. The disease soon subsided and the troughs and fountains were again opened in the fall.

Much more security is felt now in raising hogs; the last census shows a decided increase in swine valuation—it is now $15,594,000 which is nearly double the valuation in 1900. Most of the security has been brought about by a better understanding of hog cholera. This disease would often wipe out a good herd of hogs in a few days and the owner was helpless to prevent or cure the disease. In anti-hog cholera serum we have a safe and efficient means of prevention. Much more can be accomplished now than in former times by careful sanitary measures. Most hog raisers know how the disease is spread and can fight it successfully with sanitary measures. More might be done in this line. There is a tendency to depend too much on medicine and vaccination even by those intelligently interested. Pennsylvania still uses the serum method of vaccination alone and then only in infected herds. Many other states are still practicing the simultaneous method, in most cases, it will be observed, that the disease is more widely spread than it was before vaccination was discovered. The simultaneous method of vaccination may be good for the individual breeder, but for the State and county at large there can be no doubt of its being a menace to the hog raising industry when it is used indiscriminately.

In the simultaneous method of vaccination, the virus is given to produce hog cholera, then the serum is given to check the disease and make it run a mild course. The nearer the victim comes to dying and lives, the more sure are his chances for obtaining a lasting immunity. Every farm upon which the simultaneous method of vaccination is used, may be considered an infected farm and the disease can be spread from such farms in the same way as from afar, where the disease has occurred accidentally. If serum alone is used in an infected herd, the immunity is just as lasting as where the disease is produced purposely by injecting virus. The simultaneous method of treatment would not be so bad if its use were confined to infected herds only. In these it is not necessary for the reason that the disease will be contracted accidentally. Where virus is used on sound and uninfected herds, the premises become infected and should be looked upon as a menace to hogs in the neighborhood. The more herds vaccinated in this way, the greater the danger to the

hog raising community, unless the system is continued as far as the industry extends. The simultaneous method of vaccination may be used safely under certain conditions; these conditions can't be followed profitably or safely at present by the average hog raiser. The State furnishes serum free to the farmers where the disease exists. It must be used by one who knows the disease and has been trained in administering the remedy.

Rabies is found in most all section of Pennsylvania. It affects all livestock and occasionally poultry. Carnivorous animals are the most predisposed to it and are the ones that spread it. There has been nothing new discovered in reference to handling this disease. The Laboratory diagnosis is considered positive. It is believed that but few mistakes are made in ascertaining whether the animal was or was not affected with the disease. Where a case of rabies is suspected, the head of the animal may be sent to the Laboratory of the State Livestock Sanitary Board in Philadelphia and within twenty-four hours the shipper can be notified definitely whether or not the case is rabies. This information is frequently asked for and is of vast importance in cases where persons have been bitten by animals suspected of having rabies.

There has not been as much rabies during the past year as in some previous years. It is customary to kill animals that have been bitten by dogs that were known to have had the disease. The State allows no indemnity for damage done to stock by rabid dogs. It is possible in some cases to indemnify the owners for such losses from the local dog tax fund. It is also possible to have the Pasteur treatment given to poor people and pay for it out of the same fund. The most effectual way to control rabies would be to destroy the worthless, homeless dogs. This would be a blessing to the sheep industry, as well as assist greatly in preventing the spread of rabies. It would seem that there might be some just law provided that would compel people to confine dogs that are kept as pets or for pleasure, and force the killing of those that are homeless or uncared for.

Contagious abortion in cattle is still receiving much study. Breeders are becoming more familiar with the way the disease is conveyed from farm to farm and from animal to animal, and more effectual sanitary precautions are being practiced in breeding herds. A rather extensive experiment was tried during the past two years in the use of medicated methylene blue as a cure for the disease. Many inquiries were received in reference to the treatment which had been mentioned in a number of the dairy papers. The treatment was first recommended by Dr. Rich, of Vermont, and the State supplied the medicine, with instructions for its use. Some of our breeders claim to have had good results with the treatment, but the evidence collected altogether has shown it to be of no practical benefit.

The most effectual method known for combating the disease is in the line of antiseptics. Considerable work has been done by the State in reference to diagnosing the disease. It has been found that the blood examination or what is known as the complement fixation test will show the infected animals in a high percentage of cases. When the diseased animals are known, can be isolated and kept under antiseptic conditions, it is possible to keep the disease from

spreading to other members of the herd and advantage can be taken of the fact that aborting animals usually develop an immunity. They seldom abort the second time and it is very unusual to find one that aborts the third time. Some may become sterile as a result of the disease, but after the second abortion they usually carry the calves to full term. It can be controlled in herds by following the instructions in circular No. 20, which is sent out by the State Live-stock Sanitary Board. Breeders of valuable cattle are recommended to adopt rigid sanitary measures for its control.

Many young animals still die each year with such diseases as navel infection, white scours, joint evil, paratyphoid infection and calf pneumonia. These diseases are practically all caused by the same class of infectious organism, and when once they become established in a herd or in a stable, the losses each year in young animals is very discouraging, as practically all cases are incurable and the fatality is high. The only means of meeting the losses from this class of diseases is in their prevention, and prevention can only be brought about by a rigid system of sanitation or what is known in medicine as surgical cleanliness. This can be brought about in a practical way by isolating the pregnant animals, placing them in stalls that have been thoroughly cleansed and disinfected before parturition, and the dam and young animal kept in such quarters for the first week. The infection in each of these diseases is easily carried on the hands of clothing of the stable help, on the body of the dam, in troughs or buckets that have not been boiled or cleansed, and it is difficult to explain to those who are not skilled in the science of bacteriology the importance of thorough cleanliness.

These diseases, as well as foot-and-mouth disease, tuberculosis, contagious abortion, etc., can easily be carried from farm to farm in skim milk that is returned from the creamery as food for calves or pigs. These diseases may also be carried in the cans from infected herds to the creamery and thus infect the milk and other cans and then be carried to various herds in the community. To meet the dangers from spreading infection in this way, the last Legislature passed a law requiring the pasteurizing of skim milk by heating it to 178 degrees F. It is known that this temperature will kill the organisms that cause these various diseases and that milk that has been heated to this temperature can be fed safely to susceptible animals. During the last few months foot-and-mouth disease has been spread considerably through creameries by infected cans, and milk returned to other farms as food for hogs and calves. In some cases farmers have objected to handling hot milk, and so far we have no economical method for cooling milk properly. For this reason many of the creamerymen have been slow about installing pasteurizing plants. An efficient method for pasteurizing skim milk can be installed in any creamery that is equipped with steam for less than $10 and this form of pasteurization can be worked with a minimum expense and labor. The only criticism offered by most creamerymen for not installing and using this method of pasteurization is the fact that farmers object to hauling hot milk, and that heated milk does not keep so well when they get it home.

It is hoped that creamerymen and their patrons will soon realize the importance of pasteurizing milk that is used as food for hogs

and calves and that each party will co-operate in devising methods for pasteurizing, cooling and keeping milk that will not be a means of conveying transmissible diseases from farm to farm. It is equally as important that cans should be washed and properly sterilized at the creamery or before they are returned to the patrons. Many good breeders prefer to separate the milk at home and sell only their cream. In this way they can escape the danger of bringing new and expensive diseases to their own premises. The Blakeslee pasteurizer does its work in a clean, efficient manner, while many of the improvised methods are unsatisfactory. If the milk is heated to 180 degrees F. with the Blakeslee, run into clean vessels, taken home in clean cans, placed immediately in cold water and fed out of clean pans when properly cooled, there will be no trouble. Milk that is too hot, too cold, or putrid, may cause digestive disturbances especially in pigs. Faulty feeding of this kind can be overcome by a little care. In no case will the loss equal that caused by feeding unheated milk which may have been infected with tuberculosis, foot-and-mouth disease, etc.

The great question of how to handle tuberculosis is still in an unsettled condition. Practically there has been no change made in the last year in reference to eradicating or controlling the disease. During the first part of the year there was no money obtainable for paying indemnity on animals destroyed when they had been condemned as tuberculous. As soon as foot-and-mouth disease occurred in the State practically all testing for tuberculosis was stopped, for two reasons: It was thought that the disease might possibly be spread by those making the tuberculin test; and the money available for controlling tuberculosis was much more needed in the eradication of foot-and-mouth disease. For these reasons there has been very little testing for tuberculosis done since the middle of October, 1914. In the herds that were tested during the past year, the disease was not as extensive as in previous years. It is believed that some changes might be made in reference to handling inter-state cattle; the present law requires the tuberculin test on all animals over six months of age that are brought into the State for any purpose other than for immediate slaughter.

During the past year the State tested a great many young cattle in Lancaster and Pittsburgh. These animals came from Canada and the West. The percentage of reactions in such animals was very low, practically all the condemnations were from the dairy breeds. Tuberculin tests are not urged or forced upon native herd owners and in no case can they be paid an indemnity for reacting cattle unless they are willing to comply with the requirements of the State Livestock Sanitary Board. They are required to sign an agreement before the test is applied that in case tuberculous animals are found, they will have them properly isolated or destroyed promptly; that the stable will be promptly and properly disinfected and that they will purchase no new animals and place them in the herd until they have been tested and examined by a person authorized by the State.

These restrictions make it impossible for dealers to obtain an indemnity from the State. Even with the restrictions as rigid as they have been, the applications for tuberculin tests have been all that

the State was able to handle with the amount of money available. Some have felt that the appraisements are not sufficiently high on cattle that are condemned for tuberculosis. If the limit in price for this purpose is to be raised, it will be necessary to obtain very much more money from the State Government to be used in the work of eradicating tuberculosis. Whether it is advisable to make this move is a question.

A physical diagnosis has been advocated by some and principally by those who are opposed to tuberculin testing. Very little can be accomplished in exterminating tuberculosis where the physical examination alone is depended upon. It is not possible for even the best veterinarians to pick out 5% of the tuberculous cattle by a physical examination alone, and very little headway will be made in exterminating the disease when 95% of the diseased animals are allowed to remain with healthy animals. In tuberculin we still have the most positive method of detecting tuberculous animals. When properly applied, it is accurate in more than 95% of cases.

The State has experimented considerably during the last year with different methods for applying tuberculin. The old subcutaneous form of application is still considered best, yet good results have been obtained in many cases with what is known as the ocular test, the intradermal test and the intra-palpebral test. For making the last three named tests a special form of tuberculin is required. Under certain conditions they are more reliable than the subcutaneous test and the veterinarian at the present time who is thoroughly qualified and competent to test cattle for tuberculosis, should be familiar with and prepare to apply any or all of these four tests, and in addition to using them, should be able to make a careful physical examination. The person who is properly equipped to make these various tests, combined with a careful physical examination, should be able to detect tuberculosis in more than 98% of the cases, and make mistakes in less than 2%.

Where results so good can be obtained, it would seem advisable to develop these methods to the highest possible standard, and everybody concerned use his efforts to do away with the careless methods that have been practiced in too many cases.

The CHAIRMAN: What will be done with this report.

The SECRETARY: I move that the report be adopted and spread upon the minutes.

MR. GEORGE STEVENSON (of Waverly, Pa.) Is any person present privileged to discuss this subject in accordance with the program?

The SECRETARY: There is no reason why any member who has anything to say should not speak right out.

MR. STEVENSON: I am uot a member of the Pennsylvania Board of Agriculture. I am simply a citizen of Pennsylvania and happened to be present.

The CHAIRMAN: What is the name?

MR. STEVENSON: George Stevenson, of Waverly, Pa.

The SECRETARY: I move that the gentleman be allowed to speak.

The motion was seconded and adopted.

MR. STEVENSON: Mr. Chairman and Gentlemen: I want to congratulate you, Dr. Marshall, on the broadness with which you have treated this much discussed subjected of the tuberculin test, especially as applied to interstate shipments. But what I cannot let go is the statement that tuberculosis can be detected by the tuberculin test in 98% of the cases, for the Federal Bureau of Animal Industry has in their possession the result of the experiments carried on through many years through which they proved conclusively that this is not true of 98% or 95% or 85% or even 75%, but that the test is a flat failure in 100% of the cases, and when one of their assistants in Chicago made an absolute failure of 70% in testing 500 dairy cows and yet claimed it was 98% accurate. I believe that the cattle industry of Pennsylvania and of the United States has been very badly injured in every way by the application of the tuberculin test in interstate shipments. I know dozens of cases in which animals have re-acted at the first test and for years after failed to react and been returned to the herds and pronounced free of tuberculosis. I believe that before adopting this resolution or permitting any more appropriations, the citizens of Pennsylvania are entitled to a full report of the Sanitary Board, which, since its creation, has had $1,600,000 appropriated, a large part of which was devoted to tuberculin tests.

In Dr. Marshall's treatment of myself I have had nothing but the kindest courtesy from Dr. Marshall and all his assistants. I think they are thoroughly honest; but I think they are mistaken. If the Federal Bureau of Animal Industry will give us their experiences, the actual facts of each and every application of the test—in the great State of New York—Dr. Moore said, in a lecture, "We have had tested less than 1% of the dairy cows of the State of New York and it cost us $400,000." The State of Pennsylvania, if you test them all, will be bankrupt. In 1913 less than 3½% of the cows of Pennsylvania had been tested for tuberculosis. What has this cost us? It is time to stop, look and listen, before we go on. I would like to have a resolution adopted at this meeting and again passed in the Senate and House of Representatives, demanding a detailed report of the actual results on each and every individual cow, before we adopt any resolution endorsing the tuberculin test for interstate shipments of cattle. I expect to have more to say on this subject in the future.

MR. SHROAT: As a citizen of Pennsylvania, may I reply to Dr. Stevenson?

The CHAIRMAN: If there are no objections the gentleman will be occorded the privilege of the floor.

MR SHROAT: Mr. Chairman, Dr. Marshall, Ladies and Gentlemen: This is my first appearance regarding the tuberculin test. I have read with much interest your articles appearing in various dairy papers, Dr. Stevenson, and at one time I felt that you were right.

The SECRETARY: Address your remarks, please, to the Board, instead of to Mr. Stevenson, and speak louder.

MR. SHROAT: I beg your pardon. In the third issue of Hoard's Dairyman last year, Mr. Stevenson wrote a criticism regarding the criticism of Prof. Hastings in reference to Mr. Gardner. In his article Mr. Stevenson, as he repeated to-day, claims the unreliability of the tuberculin test to eliminate it in interstate shipments; he also states further that less than one-half of 1% of the dairy cattle of New York State had been tested and with no result, that there could be no results with less than one-half of 1% tested. In replying to Mr. Stevenson that the tuberculin test has not been valuable—and he also states that there is no evidence in hand of any herd of dairy cattle that had been permanently cleaned up by the use of tuberculin—with your permission, I will read a little article in regard to this.

Mr. Shroat then presented the following paper:

TUBERCULIN TESTS.

In criticizing Prof. Hastings in April 3rd issue of Hoards' Dairyman, Mr. George E. Stevenson asked for information that would indicate any herd of dairy cattle that had been permanently cleaned up by the use of tuberculin. In reply to this the senior editor, Ex-Governor Hoard, stated in an editorial, "The Senior Editor of Hoard's Dairyman has repeatedly stated in this paper that he believed that he had succeeded in banishing tuberculosis from his herd by the use of tuberculin, and yet we never received any inquiries from Mr. S. that we can remember of; for the sake of his information, we will make the statement once more." We commenced testing in 1897 from that until 1900 we tested every animal in the herd once a year, killing all that showed a re-action then conducting a post mortem. From 1900 we have, as a rule, tested the herd once a year and found no reactors. We believe that the Hoard's Dairyman herd had been made free from tuberculosis and that it could not have been done without the aid of tuberculin.' From the bulletin "The Results Obtained in the Eradication of Tuberculosis from a Herd by the Use of Tuberculosis and the Bang System" by S. H. Gilliland, V. M. D., M. D., the following result of the tuberculin test is taken, starting in the year 1904 at which test a reaction of 26.2% was obtained.

1905	June,	10.8
	November,	5.1
1906	April,	8.4
	November,	3.6
1907	April,	....
	October,	....
1908	April,	1.4
	November,	1.8
1909	April,	....
1910	May,	3.3
1911	January,	2.5

Owing to the insidious nature of the disease the writer believes this herd "permanently cleaned up;" and further believes that any reaction of less than four or five per cent should be so considered. The October 1st issue of the Holstein-Friesian Register contains an article taken from the Journal of the American Medical Association, on Tuberculosis of Dairy Cattle: "A ten years investigation, carefully verified and supervised by government officials, has been reported by Brooks in connection with what is probably one of the most valuable herds of Holstein-Friesian cattle in the world. The object was to produce a herd of Holstein cattle, free of the tuberculous taint, and yet endowed with all of the most valuable strain-characteristics possessed by this herd, animals were selected because of their desirability, entirely independent of the presence or absence of the disease. The tuberculous animals greately outnumbered the non-tuberculous. Three hundred tuberculous animals were studied. The existence of tuberculosis was determined by the use of treble the official dose of tuberculin, repeated in non-reactive animals at intervals of six months, all animals reacting to either test were removed at once to the tuberculous farm so that there was no possibility of the transmission of infection from the tuberculous group to the healthy ones. At birth the calves were immediately taken from the mother. Feedings are of pasteurized milk collected indiscriminately from sound and infected animals. Of more than 200 calves born of the tuberculous herd not one has become tubercular although all have been tested three times with massive doses of tuberculin."

An editorial from Hoard's Dairyman, January 15th issue, reads as follows: "It is a favorite saying with those who oppose the tuberculin test that it is not reliable, that no one has ever yet maintained a herd free from tuberculosis by its aid. The senior editor has repeatedly called the attention of these skeptics to the Hoard's Dairyman herd of Guernsey cattle, where not a reaction has been found to the tuberculin test in 14 years, and not a case discovered by post mortem when cattle have died from other causes."

The Wisconsin Experiment Station issued last month a bulletin giving a history of what has been done with the tuberculin test in Wisconsin. The following paragraph is a triumphant answer to these fanatics who claim that no herd has been kept free of the disease by the tuberculin tests.

"The College of Agriculture of the University of Wisconsin was the first of the agricultural colleges in the Mississippi Valley to apply the tuberculin test. In 1893 the college herd was tested and 25 out of 30 were found to be tubercular. The herd was destroyed, a new herd built up, and in spite of constant changes by purchase of animals, a healthy herd has been maintained for 20 years. This has been accomplished by the persistent use of the tuberculin test and the employment of preventative measures."

Mr. Hubert Work, Pueblo, Col., relates his experience with tuberculin as follows: "Early in 1912, 17 head of registered Holsteins, tuberculin tested, were bought at public auction, costing over $6,000. At the end of two years, 7 head, costing over $3.000 were condemned, slaughtered and found to be tubercular. These animals at the same time were kept in a herd that, from the day of its founding in 1900 to the writing of this letter, had been tested not oftener than six

months, nor later than 12 months, without reactors, except the stable mate of the diseased bull bought and condemned."

Though these cows showed a clean bill of health when purchased, Mr. Work was steadfast in his confidence in the tuberculin test, giving it expression in the following manner:

"There is no manner of doubt that cleanliness in barn, the honest and scientific use of tuberculin and introduction of healthy stock only will keep a herd free from tuberculosis. But the failure of the tuberculin to react to-day is no guarantee that the animal has not recently been exposed to the disease and infected." Apparently the menace of tuberculin in America is less than our danger from the attitude of those who sell it.

Mr. William Ernst, of Munich, in his book on Milk Hygiene, the latest work published, shows the eradication of tuberculosis in foreign countries. Ragner's results show that the first tubercular test in 1,366 herds, out of 49,112 animals tested, 14,175, or 28.9% reacted; that in 1909 the same herds contained 57, 734 animals of which 1,731, or 3% reacted. Bang succeeded in Denmark from 1893 to 1908, in gradually reducing the percentage of reacting animals from 40 to 8.5%. Malm in Norway from 1896 to 1903, reduced the disease from 8.4% to 4.9%. Hojer in Finland in 1894 to 1900 caused the infection to drop from 24 to 10.1%. Hutyra reports on experiments carried out on the government farm of Nezohegyes. In this test the first tubercular test in 1898 showed 44.8% of reactors out of 329 cows, or 26.6% of the entire herd, 647. Whereas, in the fall of 1903, out of 502 cows, only 2.8%, and out of the total of 1,132 animals only 1.8% reacted to the tuberculin test. The herd had been increased in this period 75%, without purchasing additions to it and the percentage of reaction had dropped 88%.

The CHAIRMAN: As I understand, the evening session of the Board is a joint session with other Associations and will be held in this building. As our time is now up for the next topic, are you ready for the question? All in favor of the motion accepting and filing the report, will say Aye.

The motion was adopted.

The CHAIRMAN: It is so ordered; the report has been adopted. The next on the program this afternoon is the report on Fertilizers, by John Shoener, of New Ringgold, Pa.,

Mr. Shoener then presented the following report:

REPORT OF COMMITTEE ON FERTILIZERS

By JOHN SHOENER, *Chairman.*

A year ago, when the Executive Committe honored me with the appointment of Chairman of the Committee on Fertilizers, I promised them to make my report from the farmer's standpoint. The

subject of Commercial Fertilizers is an important one to the farmers of Pennsylvania, as it has considerable effect upon their bank account. Next to the cost of labor, the fertilizer bills are the farmers' largest item of expense. The use of commercial fertilizers is continually increasing. In my own section, it has doubled within the last five years. Hay always brings a good price, labor is high, and competent help scarce at any price. This has induced the farmers, in many instances, to reduce their livestock and increase the use of commercial fertilizers. Where most of the crops are sold from the farm, they carry with them a large amount of plant food which they have taken out of the soil. This can only be replaced by hauling manure back to the farm, or by the extensive use of commercial fertilizers. Where the farmer lives close to a city and can get the manure cheap and fresh from the stable, the hauling of manure would probably be the best method to keep up the fertility of the soil; but comparatively few farmers are so situated, and the intelligent use of commercial fertilizers together with green manuring lime is to be recommended.

Much of the money expended for fertilizers is wasted in buying low grade fertilizers which are sold on their brand names and the long double column of figures showing the analysis; where, if the manufacturers were required to print the actual number of pounds of available plant food of the constituents contained, and the sources from which they were derived, the ordinary farmer would, at a glance, see what he was buying. No farmer would buy 1—7—1 fertilizer, if he knew that a ton contains only 16½ pounds of nitrogen, derived from a very low grade of material, 140 pounds of available phosphoric acid, derived from one-half ton of 14% acid phosphate and 20 pounds of actual potash, derived from low grade kainit. All the plant food contained in such a fertilizer can be bought under ordinary conditions for $8.25; and yet with an attractive brand name, hundreds of tons of this fertilizer are being sold throughout Pennsylvania at prices as high as $25 per ton. Fertilizer manufacturers tell us, that such low grades are put up especially to fill a demand for a cheap fertilizer. The intelligent, prosperous farmer will not buy it, but the fertilizer dealer will sell it to the poor uninformed farmer at prices two or three times as high as he could have bought the same plant food in a high grade fertilizer.

I would recommend certain changes in our fertilizer law. First, the repeal of Sections 1, 2 and 3 and the enactment of the following:—

Section 1. Be it enacted, etc., that every package of commercial fertilizer sold, offered or exposed for sale, for manurial purposes within this Commonwealth, except the dung of domestic animals, lime, marl and wood ashes, shall have plainly stamped thereon the name and address of the manufacturer or importer and his place of business, the net weight of the contents of the package, the actual number of pounds in a ton such fertilizer contains of nitrogen in available form, of soluble and reverted phosphoric acid, of potash soluble in water and the sources from which these ingredients are derived. Provided, that no other figures be stamped on the package except the per cent. of nitrogen, phosphoric acid, and potash in an available form, may be stamped thereon in three figures only.

Section 2. Every manufacturer or importer of commercial fertilizers, as specified in Section 1 of this act, shall, on or before the first day of January of each year, or before offering them for sale within this Commonwealth, secure from the Secretary of Agriculture, a license to sell fertilizers within this Commonwealth, for which he or they shall pay the sum of twenty-five dollars ($25).

Section 3. Every manufacturer or importer of commercial fertilizers shall, annually, at the end of each year or before the first day of January of the following year, file with the Secretary of Agriculture an affidavit showing the number of tons of fertilizers sold within the Commonwealth during the last preceding year; and he or they shall pay or cause to be paid to the Secretary of Agriculture, the sum of ten (10) cents for each and every ton sold within the State during the last preceding year. Provided, that all moneys so received and all moneys received for license, as provided in Section 2, shall be immediately paid by the Secretary of Agriculture into the State Treasury, for the use of the Commonwealth. Second, That Section 5 be so altered and amended as to comply with Sections 1, 2 and 3 and that the penalties as now provided in Section 5 be increased.

I would also recommend that special examinations be made of nitrogenous fertilizers, so as to determine the available and the inactive or insoluble nitrogen present in all fertilizers where the manufacturer makes a guarantee for nitrogen. and that a sufficient appropriation be made to carry on the work.

I would further recommend that in the tabulated analysis of commercial fertilizers of the Department of Agriculture, the actual value of plant food contents be given instead of the computed commercial value. By that, I mean the value of the ingredients contained, at what they could be bought delivered at any railroad station in the State, in carload lots for cash. There is a marked difference between the value of plant food contents and the computed commercial value as given in the Bulletin. The cost of the plant food elements contained in commercial fertilizers increase from the time they leave the wholesale commission house, and by the time they reach the farmer, who buys in small quantities from the local dealer on time, the cost has doubled and trebled, if low grade fertilizers are bought.

By co-operative buying of the various materials and intelligent home mixing, one-half of the money expended for fertilizers by the farmers of Pennsylvania, could be saved. The intelligent farmer is in a position to know better what his soil and his different crops need, than the fertilizer manufacturer, many of whom have never seen a pound used on the farm. He can mix his fertilizers to suit any crops or conditions. In case of a quick growing crop, he can get his ingredients from sources that contain the plant food in the most available form. If it is a slow growing crop, he can get his plant food from sources that are not all at once available, but that become gradually available as the plants need it. Where, if he buys ready mixed fertilizers, he does not know from what sources the different elements are derived or when they become available. Farmers, who mix their own fertilizers, use higher grades of fertilizers, than those who buy ready mixed goods, and consequently grow larger crops.

During the year 1914, 340,000 tons of commercial fertilizers were used by the farmers of Pennsylvania, for which they paid approximately $8,000,000; of this amount, not more than $3,650,000 went for materials; $680,000 for mixing and bags, $680,000 for freight; and about $3,000,000 for officers' salaries, dividends, traveling salesmen and local agents' profits. The average price to the farmer was about $23.00 per ton for an average analysis of about 1—8—14. This fertilizer contained plant food worth last year less than $13.00. There were instances where it was sold by local dealers for $30.00, a 5—6—6 for $60.00, a 14% acid phosphate for $20.00, and a 5—6—3 for $17.00.

No farmer can afford to pay such prices for fertilizers and the farmer who pays such exorbitant prices knows very little about them. If the laws could be changed, as recommended in this report, and the actual value of fertilizers given in the bulletin, farmers would soon learn what to buy and what to pay for them. The fertilizer manufacturer would have to adjust himself to new conditions and the dishonest manufacturer would soon be out of business. There would still be a good honorable business for the honest manufacturer. He would no longer be bound down to a licensed brand or brands, but would be at liberty to sell any analysis that the farmers wanted, and under the new law, they would know what they were getting. By cutting down some expenses, such as high salaries, traveling salesmen, local agents, and long term credits, and sell direct to farmers in carload lots for cash, the farmers could get their fertilizers ready mixed, better than they are able to mix it themselves, and still have just what they want and at reasonable prices.

MR. FENSTERMACHER: I move the adoption of this most excellent report with the thanks of this body.

The SECRETARY: I doubt whether the adoption of a report that contains such sweeping changes in any one of the acts of the Assembly under which we are acting is safe; I am not sure. I am entirely satisfied that it shall be adopted, that it shall be received in order to be spread upon the minutes or published in the general proceedings, and that it be referred to the Committee on Legislation with a recommendation that they take such steps as in their judgment, after due deliberation, seems proper. Now, you perhaps fail to remember that at the last meeting there were some very distinct recommendations made with regard to amendments to the fertilizer laws, and they will have to be acted upon. They are in the Legislative Committee. If we adopt this we will forestall what our Legislative Committee tries to do, and it does seem to me that it would be better not to take that course. However, I am only one of your number, I am not here to direct what you shall do; I don't want you to think that.

MR FENSTERMACHER: I accept the Secretary's amendment to my motion.

The SECRETARY: Then the motion will be that the report be received and ordered published in the general proceedings and that it be referred to the Committee on Legislation with power to act.

MR. BRONG: I second the motion as amended. The recommendations in this report are not materially different from the recommendations already in the hands of that committee.

The SECRETARY: Of course I cannot remember just what the recommendations are, but there should be no conflict coming from the same body.

The CHAIRMAN: Are there any other remarks or discussion of this report?

There being no further discussion, the motion as amended was adopted.

The CHAIRMAN: The next on the program is the report on Wool and Textile Fibers, by James M. Paxton, of Houston, Pa.

Mr. Paxton presented the report as follows:

REPORT OF COMMITTEE ON WOOL AND TEXTILE FIBRES

By JAMES M. PAXTON, *Chairman.*

Sheep were raised in the earliest times for their pelt and without regard to the wool. They were the earliest domesticated of any of the wild animals, and this domestication, together with the breeder, has changed the character of the animal very much. At the present time there are but few wild sheep known. History tells us that God's chosen people had all their richest attire made of the product of the sheep, and of the Jewish maidens holiday attire being woolen garments made from the finest and softest wool.

By consulting statistics we will readily understand why the production of wool has been the one purpose which our sheep breeders have had in view. Beginning with the year 1825 we find wool selling at seventy-five cents per pound, and the average price for twenty-five years from that time was fifty-four cents per pound. Beginning with 1850 we find wool selling at an average for the next quarter of a century of over fifty-five cents per pound, and during the time from July, 1864, until the following spring, it sold for $1.00 per pound. No wonder breeders were stimulated to produce wool. About this time the American Merino sheep was produced, which as a wool producer, has no successful rival. Beginning with the year 1875 we find for the next 12 years fine wool sold at an average of only forty-one cents per pound, and from that time to the present the market has drifted downward until now wool has become so low that sheep raisers are paying more attention to the production of mutton. Sheep raising does not seem to have been undertaken on so large a scale as perhaps it should, as sheep yield a double return—meat and wool. As a meat-food animal sheep have never been sufficiently appreciated in the United States. They are, however, of very great value and must be classed with swine and

poultry as the most available animals to supply meat for home use on the average farm, as they are readily slaughtered, the meat can be kept without difficulty, it is nutritious, wholesome and palatable when properly cooked.

Sheep are more prolific than most farm animals, the increase being 100 per cent. or better in some cases. Government data shows an alarming decrease of livestock in recent years. The receipts of sheep at six of the leading markets for September, 1913, and 1914, show a total decrease of 301,686. There is a world shortage of sheep. The population of the world has increased near 30 per cent. in the past 15 years, but practically no increase in the number of sheep, and six of the leading markets of the United States show that the receipts of sheep in 1914 was 777,134 less than in 1913, and in fourteen markets including those just mentioned we find a shortage of 950,000 sheep. With the European war on hand and the armies being followed by bands of sheep for food, it is quite to be expected that the 113,600,000 sheep now owned by the warring nations will be almost exterminated before the war ends. Besides the increased demand for wool by these nations, large orders for army blankets and clothing have been placed here by the French Government. With the present prospects of a wool scarcity and the fact that we have a vast amount of land here in Pennsylvania well adapted to sheep raising—rough hills too steep to cultivate—that should remain in permanent pasture and are not as yet infected with parasites—I would urge all farmers to raise some sheep. It may be the time of large flocks in Pennsylvania is past, but now is the time for a small flock on every farm.

A sheep bred exclusively or chiefly for wool must necessarily be valued in proportion to the value of the fleece. The wool of a pure-bred Merino of any value should stand at right angles to the skin, presenting a dense, smooth, even surface on the exterior, opening only in those natural cracks or divisions which separate the fleece into masses. These masses should not be small in size or they indicate excessive fineness of fleece, (a quarter of an inch is the limit in this respect) nor too large, lest the wool be coarse or harsh. The length should be such as combined with thickness of staple will give the greatest weight of fleece. Medium wool is generally in greater in demand than fine wool, and is more profitably produced. Two or three inches is probably the most desirable length of fleece for profit. The wool should be sound, that is, of even strength from end to end, of the fibre. It should be highly elastic and wrinkled, curved or wavy, the number of these curves or waves to the inch is not so much a test of excellence as their regularity and beauty of curvature. The softness to the touch in handling is an excellent test of quality so much prized by manufacturers.

Much space you say is given to the Merino sheep in this report. The Chairman of your Committee represents a county which the Merino sheep made famous as the first and best fine wool producing county in America. The latest available reports show the county clip of wool to be around 1,000,000 pounds and the market quotations 28 to 30 cents per pound. In November, 1914, at Buffalo, Washington county, during one session of the Farmers' Institute, 22 sheep owners present reported having on hand 3,670 sheep, and it was

also stated that within a radius of eight miles, 5,000 sheep were owned. The last census showed that 196,000 sheep were owned in Washington county. It is the prediction of your Committee that many of the boys now being reared on the farm will remain there and raise animals to restock the nations now at war, and a great future is in store for the Pennsylvania sheep man. We give the following reasons why most all Pennsylvania farmers should raise a few sheep:

1. They will thrive and do well on the rough hillsides better than any other of our farm animals.
2. They are the cheapest means of eradicating weeds on the farm.
3. They are more economical to feed than any other farm animals.
4. They do not require much labor and bring good returns.
5. They add fertility to the farm acting as nature's manure spreader.
6. The prospect of the foreign demand for sheep and wool caused by the European situation will make the business even more profitable.

FOR THE BENEFIT OF THE SHEEP BREEDERS

We would recommend that the present dog law be amended so as to include the following provisions:

First: That the assessor be required at the time of assessing the property of every property holder of his district, as now required by law, to make diligent inquiry as to the number of dogs owned, harbored or kept by the person so assessed; that such person so assessed shall pay immediately to the township assessor the sum of $1.50 for each and every male dog or spayed female dog and the sum of $3 for each female owned or harbored by him or any of his family. That the said sum or sums shall be paid on all dogs over three (3) months of age. That the assessor shall make a memorandum of any dogs on any premises that are not claimed by the owner of said premises.

Section 2. It shall be the duty of the assessor at the time payment is made by the owners of dogs as herein provided, to deliver to each of said owners a metal tag bearing a serial number corresponding with the number on the receipt issued to said owner as herein provided; and said tag shall also have impressed thereon the calendar year for which such tag is issued; said tag to be not less than one inch wide or less than one inch in length; and the general shape of said tag shall be changed from year to year.

Section 3. It shall be the duty of the assessor to publish in two county papers a list of the dogs so assessed giving the name and address of the owner of each dog, together with the sex of each dog and the number on the tag issued therefor: Provided, in the event there is but one paper of general circulation published in the county, then it will suffice if said list is published therein.

Section 4. If upon the publication of the assessor's report, any reputable citizen of such district shall furnish conclusive proof to the County Commissioners of three or more dogs in the community

that were not reported as assessed, the County Commissioners shall be required to make an investigation of the accuracy of this assessor's work and see that the penalty of the law is carried out for such failure either of the assessor or owner to make a true report.

Section 5. Upon completion of the assessor's report the County Commissioners shall be empowered to call upon constables or state constabulary to kill all dogs not wearing a license tag regardless of whose property they may be on; Provided, however, that before such action is taken they give due notice through two or more papers that such action will be taken following a certain length of time which time shall be sufficient for any to secure the license tag for their dogs who have not done so at the time of the assessor's report. Further, that upon conclusive evidence of three or more dogs running at large in any district or community, the County Commissioners shall be required to employ someone to kill any unlicensed dogs in such community.

Section 6. That it shall be the duty of every person owning or having in charge any dog or dogs, to at all times confine such dog or dogs, to the limits or of his own premises or the premises on which such dog or dogs is, or are, regularly kept: Provided, That nothing in this act shall be construed to prevent the owner of any dog or dogs, or other person or persons having such dog or dogs in his or their charge from allowing such dog or dogs to accompany such owner or other person or persons elsewhere than on the premises on which such dog or dogs is, or are, regularly kept.

Any persons violating this provision shall be deemed guilty of a misdemeanor and shall be fined not less than two nor more than fifty dollars, one-half of such fine to be payable to the officer or other person furnishing the evidence upon which such owner or other person having such dog or dogs in his charge is convicted of such violation.

The CHAIRMAN: What shall be done with this report.

MR. SEAMANS: I move that the report be received and published.

The motion was seconded.

MR. BOND: The reference to dispensing with dogs seems to be all right, but it is too expensive when a two cent cartridge properly exploded will do the whole business.

MR. SEAMANS: I am a lover of sheep. Formerly every farmer in Lackawanna county had sheep. Now I don't believe there are 200 sheep in the county. We have a great city, Scranton, in our county and a great many hunters live in Scranton and they come out in the country when the hunting season is going on, bring their dogs and a great many dogs have never seen a sheep until the hunting season begins and they think sheep are a proper prey for them. I am very much in favor of this new dog law, but I think it is not severe enough, I would put up the price a little on them and I would say that at one time I had a fine flock of Shropshire sheep, I had some imported sheep that came from England, sheep that cost me $30 to $40 a head and were destroyed by dogs and when the appraisers appraised those sheep they appraised them for what com-

mon sheep were worth for mutton and I became disgusted. I believe that if we had a proper dog law in our State that was enforced, that the sheep business would be revived again.

MR. J. W. BRUCKHART: If there was any chance to pass a dog law like this, I think there should be a string of penalties attached to those assessors, because I know from experience where they report a hundred dogs, there's probably 1,000 dogs in this same community. The hunter stands in with that assessor; if he has got a dozen hounds, dogs like this gentleman described, he will report one or two or three, the rest are not reported and the poor fellow with one day pays his dog tax on the one dog; therefore I say make the law so that the assessor will be compelled to do his duty. The law should be made more strenuous for that assessor.

MR. FENSTERMACHER: I used to be down on the hunter's dogs; but our experience is that they are not the worst, it is the worthless cur that prowls around for a living that kills our sheep. The hunter's dog is an intelligent animal bred up under control by the hunter. We have had no damage from that source; it is the worthless curs that prowl around that do the damage. All you want to do is to raise the tax, raise the tax and get the right kind of men for assessors and you will have no trouble.

The CHAIRMAN: Mr. Fenstermacher is a little late. In our county, Indiana, we are worse; we used to keep a great many sheep, but instead of sheep we have a great many miners in our county and wherever you have miners you have dogs; that is our trouble, with the dogs of the miners. I know one gentleman in our vicinity, and you never see him out but he has at least seven dogs at his heels. They are not always at his heels either, because they are sometimes after sheep. I am one of the town auditors and it is my business to help to appraise such sheep as may be killed. Last year I was called out seven times in, I think, about half that many weeks, to inspect sheep that had been killed. This year, this past summer, I have not been called out at all, because I think the sheep are all driven out of our township. I don't think you could find a flock of sheep in our township now, because it is almost impossible for assessors to find who owns the dogs. The man in the house says the dog belongs to the boarders and by the time the dog is assessed, the boarder is gone and it is almost impossible to get the tax. It is a proposition. I agree with my friend Mr. Bond that the quickest way to get rid of them is with a cartridge.

MR. KERRICK: I went up to Syracuse and purchased a very fine flock of Southdown Jersey ewes; came pretty near getting Jersey cows. I brought them home, put them on my farm, and I think the third day after I had them there, the tenant living on the farm woke up in the morning and there were 12 of them piled up around his door. I agree with Brother Fenstermacher that it is not the thoroughbred dog that does the work, it is these miserable curs running around through the county without anything to eat. I am in favor, if we could do it, of putting the assessment up to $5.00.

MR. WILSON: I think the female dog is taxed high enough, that is, the common bitches; now why tax the son of a bitch any less. (Laughter)

The SECRETARY: Simply for the reason that the bitch will multiply into a great generation if she is allowed to remain untaxed, or if she has equal advantage with the son. (Laughter)

MR. COWAN: My experience is that it is not the hunter's dogs that do the damage. The hunters we have up there usually take care of their dogs and have them under control, and when they are led out, the hunter is with the dogs. But we have a great many dogs there that don't seem to belong to anyone, and we had an officer there a few years ago that did not have much trouble to find out who the owner of the dog was. Word got ahead of them that he was coming, and if they could not get the dog under cover pretty soon, he had the dog and saved all sorts of trouble, not only for himself. I think we ought to try and get rid of these curs, these worthless curs. A man can't keep sheep without having a dog, the only protection I ever had that I could depend on for my sheep was a dog that was constantly with the sheep and saved me many a sheep; he woke me up at any hour of the night and gave me notice that there was danger coming and I only once lost any sheep by strange dogs coming in.

MR. BLYHOLDER: The gentleman, in his paper, has given us, I think, some of the profits of sheep. Now we are discussing the dog question. I would like some gentleman to tell me the profits the Commonwealth of Pennsylvania derives or the citizens of it from dogs.

MR. DE WITT: What is the law at the present time governing the dog? I have no fault to find with the paper as read; but what is the present dog law? If the present dog law was lived up to, my judgment is that we should have less dogs and more sheep.

MR. FENSTERMACHER: There is a gentleman in the house who has studied the sheep question pretty thoroughly, I would like to call on him—Mr. Benninger.

MR. BENNINGER: I have had quite a little experience with this question, and I am convinced that Mr. De Witt is right. Enforce the law as you have it now and you will get along all right. The trouble is with the assessor. When the assessor fails to tax those dogs, he fails to do his duty. The assessor in my district, when he comes to those foreigners finds out before he gets there whose dogs they are and seizes every one of them. The moment we get the Legislature to change the dog law there's a lot of opposition, and the danger is that we will get a poorer law than we have now, so that we had better stick to what we have got and be sure that we elect the right kind of assessors and put the limit—it's now $2.00, you can put the tax of $2.00 on every dog and be sure you get them all and you will get rid of the bad ones pretty quick. My advice is not to

try to get a radical dog bill. I understand that two or three dog bills are coming up now, and the chances are we will get a poorer law than we have at this time on the statute books.

A Member: What is the tax on a female dog?

MR. BENNINGER: I think it is $5.00 now.

The SECRETARY: Does not our law at present have some duty imposed on the constable?

MR. BENNINGER: No.

The SECRETARY: My recollection is that the constable is required to kill every dog that don't have a tag bearing on a plate the master's name and showing it was assessed.

A Member: Any dog that runs at large and is not assessed can be shot by anybody as a trespasser.

DIRECTOR MARTIN: I was not present when the report was read, but I have heard some of the remarks upon the paper. There are, however, one or two very weak places in our present dog law which I would like to call to the attention of this Board. The assessor who makes the assessment probably does his work all right; but the lapse of time between the assessment of that dog and the payment of the tax is two or three months. Now who is going to tell me what damage that cur dog will do in those two or three months? In my judgment, the present law ought to be amended so as to make the dog tax allow a cash deposit to be paid when the tax is levied, and then the man who has a dog and takes care of him will have no hardship, and the people who are not responsible, with a pack of cur dogs that do most of the damage, will have to pay the tax or that dog will be executed then and there. Just embody those features in that dog law and you will save thousand and thousands of sheep, for during the past ten years we have suffered the loss of over $600 on our farms by the destruction of sheep by dogs and I don't know how many dogs we have shot. If my advice is worth anything to the law makers, it is to take up the particular point of that law and make the dog tax, when assessed, a cash tax and make it obligatory on the constable to execute that dog if the tax is not paid.

The SECRETARY: Would you have the constable travel with the assessors?

MR. LOHR: Mr. Chairman and Gentlemen of the Board: The suggestions of our friend Mr. Martin along this line are very practical, I think; but as I understand the law at the present time, it is a cash tax, there must necessarily be some little time elapse from the time the assessment is made until the tax is levied. There might be a change made in the law requiring the tax to be paid as soon as feasible after the first of the year. I think that in most sections of our State now the returns of the assessor are placed in the hands of the County Commissioner about the first of December and, as I view the situation, about as near as we could come to making this a cash tax would be giving them a period of about one month from the time

the assessment is made until the tax could be properly levied, unless, as the secretary suggests, the constable or tax collector travels with the assessor, and as each dog is assessed, require that the owner thereof pay the tax at once and the tags be placed on the dog. That would be a very good suggestion, I think.

I also realize the point my friend Mr. Benninger made, when he suggested that we might get worse instead of better dog laws if we tried to amend the laws in the Assembly. We must not forget that our legislature is composed of a great many city members who are more or less lovers of sport, and my experience in legislation has taught me that many of the members of our Committees are there for the purpose of protecting the dogs. They think that the dog has a proper right, which no doubt he has, and that the sportsmen of the State are a powerful influence in legislation at the present time, and the farmers, when it comes to putting a law of this kind through the Legislature, must be on the alert or the sportsmen and city members will outvote the farmers every time in the Legislature, so that we must be very careful that we do not get a more lax dog law instead of a more stringent law.

MR. BOND: The trouble comes in the time that elapses between the assessment and the collection of the tax. I have a neighbor who keeps six or seven dogs and he finds out pretty near the time the assessor is due. He has got friends out over the line who take charge of those dogs until after the assessment is made and he is assessed with one dog. When the tax collector comes along he places a tax on one dog. Put a penalty on the constable and make him liable for collection of the tax. I have got a place where they quarantine dogs whenever they come on the premises and it has got so now that nobody will come around my place with a dog unless he has him on his wagon.

MR. BENNINGER: In reference to the value of the sheep, as the law is now, it is not proper for the township officer to fix the value on valuable sheep, pure bred southdowns, as my friend here refers to at the price of mutton, but the officers must allow the actual value, what the sheep is worth at the time he is killed. I have had sheep killed a good many times in my county, pure bred southdown sheep, and have always been able to get the full value of what they are worth as breeding sheep and the township officers have no right to appraise their value as mutton sheep if they are breeding sheep, they must allow the full value of what they were worth at the time they were killed.

The CHAIRMAN: The Chair would like to ask a question. Suppose a man's own dog killed his own sheep and he has to have it appraised; should he receive the value of that sheep?

MR. BENNINGER: No, and he won't either.

The CHAIRMAN: Well, that has been done.

MR. BENNINGER: The first question the auditor should ask is, "Have you got a dog?" "Are you sure your dog did not kill them?" If my dogs kills my own sheep I can't get any money, or ought not to. If you find out his dog did it, you must report that to the audi-

tors, but the auditors must award you what the sheep is actually worth, and if the man refuses to kill that dog the County Commissioners must prosecute the man who owned the dog when the sheep were killed, but if the man kills the dog immediately when you find out whose dog killed the sheep, he is relieved. I went to a man that way whose dog had killed my sheep and he said he would tie the dog up, I said, "You have got to kill him immediately or you will be prosecuted." And he killed him right away.

MR. LOHR: I beg to differ with my friend, Mr. Benninger. I believe that if my dog killed my own sheep and I told the auditors that my dog killed the sheep and I killed the dog, I am entitled to pay for the sheep, but I must comply with the law and kill my dog within a certain time or I am entitled to no pay.

The CHAIRMAN: The Chair lives in this dog section. Our constable has gone out with a wagon and three or four men with him and killed as high as 25 dogs and hauled them away out of town at one time; thrown them away. I went a short time ago, a little more than a year ago, to appraise some sheep and the owner of those sheep took his gun with him and as we got within shooting distance—this gentleman owned a large farm right on the edge of a mining town—we saw two dogs eating the sheep that had been killed and the owner was afraid to lift his gun against those dogs for fear the owner of those dogs at the mine would burn him out of house and home. Those are some of the things we are up against in Indiana county and in the townships where I live. Pardon the Chair for taking up your time, but he has a good deal of experience along that line. Is there anything further? If not, all in favor of the motion that we received this report and that it be published in our proceedings, will please say Aye.

The motion was adopted.

The CHAIRMAN: Next on the program is the report of the Sanitarian, Dr. S. G. Dixon, of Harrisburg.

The SECRETARY: Dr. Dixon expected to be here, but he is the head of the Department and is very busy. I have a little experience of that kind myself and could not be here at the opening of the afternoon meeting.

The CHAIRMAN: Is the Memorial Committee ready to report?

COL. WOODWARD: Yes sir.

The CHAIRMAN: We will hear the report of that Committee.

REPORT OF MEMORIAL COMMITTEE UPON THE DEATH OF GENERAL JAMES A. BEAVER.

It is not given to very many of the sons of man to win high title as a commander of valiant warriors, distinguished consideration as an executive statesman and general commendation as an administrator of justice from the Appellate bench of his native State. To

have richly earned the right to wear the several titles of General, Governor and Judge in so important a civic body as Pennsylvania, and to have worn each of them so worthily as to have won the generous approbation of his fellow-citizens, places the life of the man whose accomplishments these were, almost as far above eulogy as it is beyond criticism, and lays upon him who has been called to pronounce its memorial a difficult though gracious task. Such a man was James Adams Beaver, and such were his achievements. If, however, the recital of these successes or even their most extended amplifications were to be the limit of the memorialist's work, it would be but illy done; for the character of which they were, at once the sequel and the exponent, furnishes the larger and richer field of exploration.

Large as James A. Beaver may have loomed in official life, he was larger as a man; a manly, courageous, just, kindly man, of wide intelligence and broad views; of strong faith, bright hope and abounding charity, as exemplified by his work; and from his early youth to his last day, a man who walked uprightly before his God. While yet in his very early manhood he set for himself a worthy purpose, established reasonable standards of living, strengthened his self-control and found pleasure in such self-development as would enable him to be of service to his fellow men.

Probably the most distinctive attribute of General Beaver's character, if, indeed, it were not its very keynote, was his exalted conception of the duty, and more particularly the joy, of service; service to his family, service to his neighbors, service to his town, his State, his country, and service to his Lord. Only those who knew him best realized the keen delight he felt in doing something for somebody or even anything for anybody. However arduous may have been any duty required of him, whatever may have been the difficulties of any task assigned him, he undertook it with undaunted courage and large faith and its accomplishment, if accomplishment were possible in the best way and to the best purpose for which his physical, mental and moral powers equipped him, was certain. Whether, as a second lieutenant, drilling the "awkward squad" of the "Bellefonte Fencibles" before the outbreak of the Civil War; as a colonel guarding the cross roads at Spottsylvania Courthouse, or as a general fighting his brigade and losing his leg at Ream's Station; whether as councilman or burgess of his home town or as Chief Executive of his native State, financing the relief of the Johnstown Flood victims; whether as a prep student at the Pine-Grove Mills Academy, as member of the graduating class of Washington College, or Chairman of the Governing Board, and sometime acting President of Pennsylvania's great State College; whether as a student at law in the office of his future father-in-law or a dispenser of justice from the Appellate Court of his State; whether teaching in his home Sunday school, counseling the Y. M. C. A., serving as ruling elder of his own congregation or moderating the National General Assembly of his loved Presbyterian Church; the same cheerful spirit, optimistic energy and absolute integrity of purpose, spurred him to give the very best service of which he was capable. He represented, whether as "Farmer," "General," "Governor," or "Judge," the highest type of American citizenship devoted to service.

It was not the least of the many distinctions which came to this all-round man, nor was it the one which he least esteemed, that from the time he was commissioned lieutenant of the "Bellefonte Fencibles," in the late fifties, by the then Governor Packer, who was himself a native of Centre county, until for the last time in his noteworthy career, he received re-appointment as member of this body from Governor Tener, he held a commission for every Governor of the State, excepting of course, himself. By the commission as Governor, received direct from the people, he automatically became, for the first time, a member of this body. His after service on the Board began with a commission from Governor Stone and was followed by those of Governor Pennypacker, Governor Stuart and Governor Tener, which latter remained in force until the Grim Reaper brought him his final commission, commanding him to "Come up higher."

It is by warrant of these commissions that we memorialize him to-day. These appointments and the commissions they carried with them, were by no means complimentary; for be it known that as a farmer, in his private life, a practical farmer of his own farm, he was governed by the same characteristics that exhibited themselves in all his work, whether as soldier, executive or judge. His large abilities and fine successes as a practical farmer were the efficient reasons for his several appointments as our earnest and efficient colleague. That high conception of the duty of service which governed his actions in all other walks of life, gave him such an appreciation of the soil as, excepting only the mind and soul of man, the most important of God's creations, as comes to but few farmers; and led him to give his best efforts to the problem of not only maintaining its power to produce, but even more strenuously to the greater one of increasing that power in each successive year. Justly proud as he was of his fine crops, he experienced a more real and lasting satisfaction in the fact that each rotation of crops left the soil better than it found it.

Of his devotion to the agricultural interest of the State as a member of this body, it is almost superfluous to speak in this presence, for it was patent to all. His clear, strong advocacy of measures which met the approval of his judgment, or his spirited objection to any which did not so justify themselves, were alike in keeping with his views of best service. His cheerful, frank manner, fine voice, enlightened judgment and clear reasoning were among the best assets of the Board, and we can but deplore their absence. In ripeness of years and fullness of good work he was gently ferried across the Dark River, and while we regret his departure from among us, he views with clarified vision the brightness of the glories which, while here, he could see only through his uncompromising faith. The epitaph which would best befit his resting-place would read: "He stood four-square for service to his Creator and his fellow-creatures."

COL. WOODWARD: Mr. Chairman, with your permission, I beg to move that this minute be spread upon the records of the Board and a properly engrossed copy be sent to the family of General Beaver.

The motion was seconded and at the suggestion of Mr. Fenstermacher, was adopted by a rising vote.

The CHAIRMAN: Someone else may have a word to say on this resolution. We will give a short time if anyone else has a word to say on the resolution.

The SECRETARY: When this Committee was appointed, I believe it was at Stroudsburg, it was understood, I believe, that it was to be a Committee to prepare a report upon the death of Gen. Beaver only, so that, having received this report at this time, it will be necessary for us to appoint another Committee that shall report at the time set in the program for the report of the regular Memorial Committee. I move you, therefore, that such a Committee be appointed. I know that there will be at least one other case upon which we will wish to give some expression of our feelings, and possibly there may be others. I move you therefore, that there be another Committee appointed and request that I shall not be the Chairman because my duties are such that I could not give it attention.

Motion seconded.

The CHAIRMAN: You have heard the motion that a Committee of three be appointed to prepare a memorial of any others that may have passed away since our last meeting. Are there any remarks?

The motion was adopted.

The CHAIRMAN: The Chair will appoint as this Committee Mr. Joel A. Herr of Clinton county, Mr. A. P. Young, of Columbia county, and Mr. J. Newton Glover, of Union county. The Committee can convene at the call of the Chairman. What is next?

The SECRETARY: If you will bear with me a few moments—I don't like to be on my feet too often—you will have observed that our good friend and ready helper from Warren county has been rendering service ever since we began our work, and I don't see how I could have gotten along without him and I think it is only due to him that his valuable services shall be recognized by being elected as Assistant Secretary for this session, and if you will bear with me for making the motion in my behalf really, I move that Mr. R. J. Weld shall be appointed as Assistant Secretary for this session.

The motion was seconded and adopted.

The CHAIRMAN: It is so ordered. Mr. Weld is the Assistant Secretary for this session. Now that is the end of the program for this afternoon. Is there other business that might be brought before the Board at this session? If there is no other business, the Board stands adjourned to meet this evening at 7.30.

TUESDAY EVENING, 7.30, JANUARY 26, 1915.

JOINT SESSION OF THE BOARD OF AGRICULTURE, PENNSYLVANIA BREEDERS' ASSOCIATION, PENNSYLVANIA DAIRY UNION, AND ASSOCIATED POULTRYMEN OF PENNSYLVANIA.

MR. E. S. BAYARD, President of the Breeders' Association, in the Chair.

The CHAIRMAN: We are going to have one speech this evening and one discussion and no more. Take your seats and let the conversation go until later. I don't want to turn Dr. Gill loose on this crowd till it is ready to hear his message. As you know, Dr. Gill is an authority on the subject of tuberculosis, a matter we have been discussing for many years and investigating. It is a very important matter to all our livestock interests, and it is a live livestock question. Dr. Gill assures me that he will be glad to have any of you ask any questions at any time as he goes along. Whenever you see anything you want to know sail in and ask him a question; don't wait till he gets done and then forget all about it, but get the information out of him as he goes along. You can't interrupt the thread of his discourse, because I don't believe he has any thread.

SECRETARY CRITCHFIELD: Spins as he goes?

The CHAIRMAN: Yes, spins as he goes. We have a good chance to learn something to-night. I notice other gentlemen here also who are well posted on the subject; so get busy, don't come around after this is over and say, "I wanted to ask him some questions but I didn't want to interrupt him"; and don't come around after he is through and ask him questions that you ought to have asked him in public while he was talking. I can't give you the pedigree of this man, I know he is a great authority on tuberculosis and is going to address us on that subject.

Dr. Gill delivered the following address:

SUPPRESSION OF BOVINE TUBERCULOSIS

By DR. H. O. GILL, *New York City.*

Mr. Chairman, Ladies and Gentlemen: I think the first thing I ought to do would be to square myself with those present. Your Chairman has introduced me as an authority. Just as soon as anyone assumes that title or assumes the title of an expert, he is in trouble for the reason that they will quote an authority on page so and so and ask you if you believe the doctrine laid down by that

authority. Now I don't want you to ask questions along that line. I am simply an ordinary, everyday, practical veterinarian, with an experience of many years, although I may not look it.

We have a subject, tuberculosis, the suppression of tuberculosis. It is a subject that has been threshed out from time immemorial and it seems even at this day not to be clearly understood. It is not clearly understood for two reasons. The first reason is that many scientific, technical gentlemen try to enlighten the general public by using technical language. To-night I am going to try and, as a matter of fact, will avoid the use of all technical Latin terms or words.

Why do we want to suppress tuberculosis? That is the vital point; why do we want to do it? So far as tuberculosis, transmitting that disease to the human family, they tell you that pasteurization will do away with that danger. Now then we get back to the economic proposition, we get back to your own welfare regarding your cattle, and the question is, do you want to breed and keep on breeding tuberculosis among your cattle? You can make your herd more profitable if you have a perfectly healthy herd, a herd not only free from tuberculosis, but free from every other disease. The product of those cows will command a higher price, and it has often been said they want us to do these things, but they won't pay for it, and I want to tell you right now that they will pay for it, you can compel them to pay for it. Why do they demand improvements and conditions that increase your expense for the production of milk, unless they are able and willing to supply a remedy, which is to give you more for your product.

Now, then, again, your cattle are worth more money if they are tuberculosis-free, so that I could continue pointing out where it is to your advantage to eradicate tuberculosis from your herd if they have it or to keep it out if they haven't got it. You all know that tuberculosis is a specific disease; therefore, it must be caused by a specific thing, and in this instance it is caused by a living organism, a micro-organism, and an organism that is not apparent under ordinary circumstances to the naked eye; but, nevertheless, it has to live and it has to eat, so to speak, to live. As a matter of fact, its habits are identical with the habits of a human being; I won't say identical, but they are somewhat similar, physiologically. Now, to have tuberculosis, you must have the seed of tuberculosis just as you must have the seed of a peach tree to develop peaches, to grow peaches or to grow a tree. You cannot have tuberculosis unless you have the specific cause of tuberculosis; Now remember that. Tuberculosis does not arise from filth or dirt or bad ventilation or unsanitary conditions of a barn; it cannot; it is impossible; you must have the seed of the disease.

Now, the question is, how are you going to get rid of this seed? How are you going to get rid of tuberculosis? The only one way is to detect the seed on your premises, in your cattle, and get rid of it. How are you going to do that? As I told you, this organism will grow and all it needs is the proper soil, all it needs is fertile soil. It is planted just the same as anything else; but it has got to have the soil to grow; if it does not have that soil, it won't grow and it won't develop. You can grow this organism outside of the animal

body; you can grow it in a laboratory; you supply this seed with favorable food and put it in an incubator at the temperature of the body and leave it there, and these minute microscopic organisms grow and thrive and they practically eat up the food that you put there for them and the result is that they have waste products just the same as a human being has waste products.

Now these waste products are utilized in the detection of tuberculosis in cattle. These waste products, treated in various ways, which I will not go into, are what is known as tubercular; it is the product of the growth, the artificial growth, of the tubercle bacilli. Remember this organism is *grown;* you've got to get the organism. First, you have got to plant it in a media upon which it will feed, upon which it will develop favorably, and then you can see these what were originally microscopic organisms, you can see them grow, because there are many millions of them in a flask of culture upon which these bugs are grown, and then they appreciate themselves, they get together collectively; but you cannot see one with your naked eye, you have got to use a microscope, and then they only appear as a very slight rod. Then we have this by-products of the growth, you might say, of these tuberculosis organisms, which is tuberculin. It is a well-known fact that tuberculin, when injected subcutaneously into a cow, is the best diagnostic agent we have for the detection of tuberculosis. Now you all know that a tuberculous cow, except when she is in an advanced stage of tuberculosis, does not go around with a sign on her that "I am tuberculous." It does not give you, under ordinary conditions, any notice that your cow has tuberculosis; but, nevertheless, she may, and she may be able to disseminate, to breathe out the seeds of this disease which, when taken up by another animal, that animal might develop the disease, depending, of course, upon certain physical conditions of the animal.

There is another way which has been advocated, of late, to a very great degree, as a sort of a way to suppress tuberculosis. But suppressing tuberculosis, in my mind, is not eradicating tuberculosis—and that is by a physical examination of the cow. All of you who have associated with cattle daily, I should say, are familiar with what symptoms a cow affected with tuberculosis in an advanced stage, should present. Many of you have no doubt put the cows in the field, the dogs have run the cattle, and you would see one cow hump up her bag a little and go "Hoo, hoo, hoo." You know that is a case of tuberculosis in that cow; you can't get away from that; you know it just as well as we do. You know that peculiar cough, that peculiar sound of the cough. You see the expression of the cow. You are better able to notice and appreciate that expression than a stranger, because you see that cow every day, or if not every day, occasionally, and you say to yourself, "There is something the matter with that cow; what is it?" That is a physical case of tuberculosis; you do not need a veterinarian to diagnose a case of that kind, you all diagnose them, yourselves. It is a common practice that when you see a cow come in, down like that as many have done in New York State, they call in the butcher and get $15, $18, $20 for a cow like that and away it goes and it is lost sight of.

The CHAIRMAN: What becomes of it?

DR. GILL: I don't want to go on record, I don't know.

A Member: We didn't hear what the question was.

DR. GILL: The question was what do they do with cattle of that kind? I am sorry to say that in New York State we haven't any State Meat Inspection Law, so there are perhaps opportunities for cows of that kind to be killed in the country abattoirs or slaughter houses, and probably they use the good parts of the meat, I don't know, I don't believe they would use the diseased part. I want to say that it is a physical impossibility which has been demonstrated time and time again for any ordinary man, upon a physical diagnosis, to pick out all of the open cases of tuberculosis. When I say open cases of tuberculosis, I mean cases where the lungs are affected with the disease, the result of the invasion of the tuberculosis organism and that communicates with the bronchiae and bronchial tubes and through the nose to the exterior and is capable of breathing out the organisms.

The CHAIRMAN: Is it possible for any one method to detect all of them, Doctor?

DR. GILL: Why, the tuberculin test comes the nearest and I think that it gets nearly all with a very few exceptions, but when there is an area in the lung, we will say, as large as that, located within the chest and in a part of the lung that is remote from the free surface of the ribs, it is almost impossible to get any sound that would indicate that the cow had that lesion at that, or in that remote part of the lungs, and many cases of tuberculosis that are generalized are in such a state with the nodules, little grape-like nodules, distributed all over the covering of the intestines and the lining of the abdominal cavity, the covering of the pleura, the chest and the heart sack, the pericardium just studded with tuberculosis nodules—those cases I have known to have been missed by the so-called physical diagnostician, so that you see that it is not a real, practical way of determining whether or not your cattle are affected with tuberculosis. If you find one acute case, it is safe to say that you have got more, there is no question about that, but I mean that it is impossible to pick out all of the spreaders.

Now, mind you, I am not speaking about all the cases, I say all the spreaders, all the cases where there are lesions in the lungs having a communication with the exterior. You know that cows do not expectorate. You know that they have an accumulation of mucus plus tubercular organisms in their throat, but instead of spitting, they swallow. They swallow their excrementitious matter from the throat and it might appear very funny to you for me to say that a cow with an open lesion in the lungs would spread the disease by spreading the organisms, but if you had seen, as I did at the University of Pennsylvania—I think Dr. Marshall will bear me out, and Dr. Pearson was there—some years ago they made a gauze mask, put those masks over non-tuberculous animals and tuberculous animals and allowed the animals to breathe through this gauze. Then they took the gauze to the laboratory and were surprised themselves; I think they found the organisms in nearly every instance, showing how the disease is disseminated, how quite pos-

sible it is for an animal to breathe out these organisms and if breathed in by a neighboring cow which is in a susceptible condition, that cow would be affected.

Now that brings up a point that always struck me from that time, and I have applied it practically, and that is to have good ventilation in a barn; not only good ventilation, but a constant disturbance of the air, a current of air just to overcome that possibility of the concentration of these exhaled organisms from an infected animal, so that the air will disseminate them and lessen the possibility of the other cows taking it.

I don't know whether you follow me in that statement or not, but there is ventilation and ventilation. You may have ventilation enough but no current of air. You may have what you think in your stable are plenty of inlets and outlets and still they may not be arranged so as to create a current of air. You may have your air stagnant; but you raise your outlet 15 or 20 feet and it will take your hat up, there will be a great circulation of air; there is where the mistake is made.

Never be satisfied from a theoretical plan. I have seen theoretical plans followed absolutely and still you got no current of air or if there was any current it was in the opposite way to that from which we are expected to go. Apply your own good common sense, put another piece of stove pipe on your outlet, a piece 6 or 7 feet long, and you will be surprised to see the result, it changes the whole situation, creates a current, and that is what you want in a cow stable. You don't want to have your cows closely confined in an excellent stable; you may build the finest cement barn with good tight windows and a cold winter's night you come in there and the cows are nice and warm, but there around the windows and on the wall is a condensation of moisture which is an indication that that stable is very, very badly ventilated, and that is one of the causes, in my mind, one of the most potent factors in the contributory causes to the spread of tuberculosis, the confinement of the air in a barn.

Now that gets us back to the tuberculin test; that seems to be the bone of contention; it may be because it is more or less complicated. It may be because it required application, very close application of the operator, of the tester. It requires the cleanest sort of observation, so as to be able to determine just what caused a sudden elevation and dropping of the temperature during the process of testing. There is a cause for all those things. It may not be due to tuberculosis, but there is a cause for these irregular temperatures.

Now then, in the first place, we have got to get our tuberculin... as I spoke of, we have got to get good tuberculin and we have got to have fresh tuberculin. Mistakes have been made by using tuberculin that had deteriorated, that had been in a warm closet or a desk drawer or on the mantlepiece or in the barn for an indefinite period of time. Don't take any chances like that, because you cannot expect to get any results. Do not use any of your left-over tuberculin, get the fresh stuff. Upon the quality of that tuberculin depends an accurate result, and it means money to you if a mistake is made.

The next step is to see that the cow receives the dose intended. If you want to give a certain amount of tuberculin, you want to be sure the cow gets it. If you give just two-fifths of a cubic centimeter, which is a very small amount of tuberculin, it is almost an impossibility to get it all out of your needle, to get it all into the cow. Therefore it is well to dilute your crude tuberculin, to take two-fifths of a cubic centimeter of tuberculin and add enough water to make five cubic centimeters, and then if you lose any of it, it is an infinitesimal amount and will not affect the result at all; but if you inject two-fifths of a cubic centimeter of crude tuberculin and lose an infinitesimal amount of that, it does affect your dose unless you give a double dose.

The next thing is to inject the tuberculin into the cow with the least possible annoyance to the cow. How are you going to do that? By using a small, sharp needle, and see that your needle is always sharp before introducing it into the cow. I have, in many instances, had my attention called by the cow itself to the fact that the needle was dull; I knew the needle was dull from the way the cow acted, and upon examination I found that was the case, and, therefore, used a new needle. So you want to have a good supply of real good, sharp, small needles, not a large needle, and you can go right along with very few exceptions, where you have fractious cows. Of course when you inject into a cow, she will pay no attention to you if she is familiar with you herself, or she will pay very little attention to you if you are dressed according to the habit of the barn, and it is a matter of very little work to inject.

The next thing to do is to have a good syringe, a syringe that don't kick, a syringe that don't leak, a syringe that has not laid on the shelf a long time and dried out, one that when you use a little pressure on the piston to force out the tuberculin, it don't kick back so that you can't tell how much you are giving. Now I should have mentioned before about taking the temperature before the injection. Of course you have got to take temperature and take them sufficiently long to determine the mean normal temperature of the animal, and you want to take temperatures at times of the day corresponding with the temperatures the next day so as to compare them and note any difference. If you should only take a night temperature before, we will say, and run along until the next night, you are not able to compare the temperature before and after at the same time, so it is always best to take the temperature in the morning, take the temperature at noon and take the temperature at the time of your injection; and if you can take it oftener than that, why so much the better.

Now the question comes, the most important part of the whole thing appears, and that is the after-temperatures, the temperatures following the injection of tuberculin. You know that if a cow is tubercular, you expect a rise in temperature; I am not going into the details or the technique of this, because I might get too deep in the bacteriological side of it, therefore I will keep out, myself. This tuberculin is injected into the cow for a certain reason. What is it? That reason is that that tuberculin is supposed, when injected into a cow affected with tuberculosis, to create a systemic disturbance of some sort. That disturbance is evident to a more

or less degree by an elevation in temperature. Now I want to say right here that it does not make any difference to what degree that temperature goes, if it goes up at all, if it goes up a degree, there is some cause for it; and if you cannot find any other cause than tuberculosis, it is tuberculosis and you have got to figure that it is tuberculosis.

Now just how long do you expect it to be before you get a reaction? Well, I might qualify that by saying: How long would one expect before he gets the maximum elevation of temperature or reaches the height of the reaction, so to speak, because it's got to go up? It may surprise you to know that I have seen that at the twenty-fourth hour, and only the other day I noticed one the twenty-second hour. The temperatures were absolutely normal up to the eighteenth hour. The twentieth hour there was a little movement of the thermometer in an upward direction. It continued and we eighteenth hour. The twentieth hour there was a little movement this to show you how essential it is to take the temperature at regular intervals from the moment of injection right straight through to the twenty-fourth hour, and then some more if you can.

Every owner of cattle, every herdsman should become familiar with the use and readings of a thermometer, and they should continue the temperature findings, to be absolutely certain, right along every two hours after injection, do it themselves if the veterinarian does not do it. The veterinarian must sleep, you know, but in the intervals you can take the temperature and I want to cite an instance that happened. I directed a veterinarian to test some cattle and he came back after taking the temperatures up to the eighteenth hour, or he telephoned me—that is the regular requirement in our State, up to the eighteenth hour. There were circumstances surrounding these cattle which were such that I wanted to be absolutely sure about it, and I wanted them taken up to the twenty-fourth hour, so that I had to ask the owner of the herd to take the temperatures himself. He was a good, practical man, had often bought cattle and made the test himself and was in position to judge whether the test was made right, and he did it and we got a generalized case on the twenty-second hour; the temperature began to rise the twenty-second hour; he took it the twenty-fourth and twenty-sixth hour and it stayed up about two hours and a half, and we slaughtered the cow and it was a case of generalized tuberculosis. I simply want to show you, but this illustration, that where an animal is saturated with tuberculosis and tubercular products, that it places that animal in an immune condition so that it offsets the fact of our injection, our ordinary injection of tuberculin.

Now those are the cases we might miss. And there was a cow that to all appearances was a perfectly healthy animal and she was in that herd, capable of spreading the disease. Now we will imagine that you have picked out all your reactors and you have gotten rid of them.

Now the next thing to do, and in my mind the hardest proposition, is to keep out the seed of tuberculosis. You must remember that you must liken this seed or this organism to any other seed or organism: it can be carried around, it can be carried by the wind, it can be carried by the manure, it can be carried by hogs, by

chickens, by anything that moves or is moved which has come in contact with the specific cause of the disease. You have many instances of that in the agricultural line, as far as the moth is concerned, for example, and a few other of those vegetable parasites.

MR. JOHNSON: Before you get away from the injection part—my observations have been that the usual manner would be when the cows are in the barn, to take the first temperature at two o'clock and from that up to seven, the point arises there, if I understand you right, that they should continue, every two hours after injection, to take the temperature; am I correct?

DR. GILL: I don't quite follow you; the preliminary temperature you say is taken at two o'clock?

MR. JOHNSON: At two o'clock in the afternoon and then every two hours.

DR. GILL: That's all right; some consider that unnecessary, but it is a good thing to do. I said that the temperature should be taken in the morning, so that the next morning you could compare the two temperatures.

MR. JOHNSON: Do you think it would be better to take the temperature in the morning and not in the afternoon?

DR. GILL: It would be much better to take the temperature, morning, noon and night at the time of the injection, than to begin at two o'clock and take the temperature every two hours because you want that morning temperature so that you can next morning compare the previous temperature with the temperature at that time.

MR. JOHNSON: There is a space of time then from eight to four o'clock in the morning that there has been no temperature taken.

DR. GILL: Between two o'clock in the morning and eight?

MR. JOHNSON: No, between eight in the morning and four.

DR. GILL: There are cases, but they are rare, where the reaction is appreciable before the eighth hour, so that if you wanted to be absolutely safe and certain, you must take your temperatures every two hours after the time you inject. Now it stands to reason that after this agent, tuberculin, is introduced into the cow, the question has often been given in civil service examinations, When does the reaction take place? It is a very short time after the injection of tuberculin. A few may have tuberculosis that is all hidden, if a cow is not sufficiently affected so as to cause enough of systemic disturbance to produce symptoms which could be discerned by an ordinary observer, but this stuff is in the cow, put in there to cause a reaction in a tuberculous cow, and it may begin sooner or later, depending upon the conditions within the animal. That is my contention, so therefore it is safer to take the temperatures every two hours from the time of the injection so as to be able

to check up and pick out these very, very few cases which will respond and react before the eighth or tenth hour. Is that your question?

MR. JOHNSON: Yes.

MR. STEVENSON: What percentage of the tests made by the average veterinary are made with the care and skill you have outlined?

DR. GILL: I might refuse to answer that question for fear of incriminating myself and my colleagues. (Laughter).

SECRETARY CRITCHFIELD: I hear some people back here asking what the question is. The answer will do those who hear it little good unless they know what the question is, and I would suggest therefore that those who have questions to put to the speaker, should rise and state their names and then ask the question just as soon as the stenographer gets the name of the questioner.

The CHAIRMAN: Let Mr. Stevenson get up.

MR. STEVENSON: My question was what percentage of the tests made by the average veterinary with tuberculin are made with the degree of skill and care that you have outlined?

DR. GILL: I might say that the average veterinarian in our state does not make any tuberculin test; the tuberculin tests in our state are made, as a general rule, by experienced veterinarians who may not, in every instance, follow absolutely the lines I have laid down. But you must bear in mind I feel that my talk to you gentlemen to-night is to enlighten you regarding the whole proposition, give you all the information that I may have affecting either the veterinarian or yourselves, so that you may profit by it. Now you are the one, if you own a herd, to direct the work, to see that the work is done, to supervise the work. If the work is not done properly, it seems to me that you are just as much at fault as the veterinarian. We may have veterinarians who are very busy and we do have them, and they cannot afford to spend all of their time, two days' time, for what they receive for testing cattle; therefore the owner should make up the deficiency, should see that the deficiencies are corrected and made up. If the veterinarian feels that the eighteen hour temperature is all right and safe, it is a legal length of time, it is adopted by all recognized bodies as being sufficiently long, but don't be satisfied with that—I am speaking to you as if I was an owner of a herd of cattle myself; I would be safe. Take the temperature yourselves for several hours longer, so as to satisfy yourself; it is easy enough to read a thermometer, but in New York State we do not have very many of the average veterinarians making tuberculin tests. The owners know who are the good men and who are the men to be relied on.

The CHAIRMAN: And some of them know who are the other kind.

DR. GILL: They know the other kind, too; you will find that out sooner or later. The dispositions of veterinarians vary just the same as your dispositions vary.

The CHAIRMAN: We have found it out.

A Member: How does the average farmer know which veterinarians are the good veterinarians?

DR. GILL: Apply to your State Veterinarian.

A Member: I am in New York State and would like to know who are the farmers that know when a tuberculin test is taken, if it is taken right? Now the average farmer does not know how to take temperature, let alone whether the rise in temperature is due to the heat or due to the tuberculin test.

DR. GILL: Well I hope I have not created the impression that I was trying to prepare you to make your own tuberculin tests, but I am simply making a statement whereby you could determine whether or not it was done properly; that's the idea.

A Member: How many of the average farmers know what the rise of temperature should be on a tuberculin test to pick out a reactor?

DR. GILL: I am speaking about the herds that are regularly tested once or twice a year, and under those conditions you will find that the farmers know a whole lot about the tuberculin test and are perfectly capable and able to read the results of the thermometer used; I am not talking about everybody, but if there are any here who don't know how to read a thermometer, why I believe that our friend Dr. Marshall will be only too glad to devote some of his official time to instructing you in the use of it.

MR. WISE: Is there any reason why a farmer should not make his own tuberculin test?

DR. GILL: I don't know of any law that would prevent an owner of cattle making his own test on his own property.

MR. WISE: I am not speaking of the law.

A Member: What was the question?

The CHAIRMAN: He asked what reason there was.

MR. WISE: If there was any reason why an intelligent farmer should not be sufficiently educated to make a tuberculin test.

DR. GILL: Why, no; do you mean promiscuously, generally?

MR. WISE: On his own herd.

DR. GILL: On his own herd, I think he ought to be; I think it would be a great advantage if the owner of the herd could take his own temperature, at least, and get an experienced man to do the injecting.

A Member: That would not be recognized by the city ordinance.

DR. GILL: No, it would not be legal, but I am talking about the testing of his own herd for his own benefit, for his own information.

A Member: Suppose I imagine that I have tuberculosis in my herd; I think I have and I call a veterinary from my own county or some other county; what is the first thing to do, what is the first thing he does after he comes?

DR. GILL: The first thing he does when he comes to your place is to examine your cows?

A Member: I am not supposed to know whether they have it or not, but I call the veterinary who does.

DR. GILL: The only way he could tell you would be by making a tuberculin test.

A Member: And then he will instruct me about the temperature, will he? It takes a regular time, as I understand it, several hours?

DR. GILL: No, I didn't say that; I said it would be to your advantage to be able to take the temperature of the cattle, to continue a little further on, and when you go out into a remote part of the country to buy cattle, it would be a good thing for you there, when the veterinarian tests them, it would be a good thing for you to continue taking the temperature even after the regular time; you may be able to pick out one out of a great many.

A Member: I understood the question from some gentleman here—of course every intelligent farmer can read a thermometer and know if the veterinarian explains it to him at what temperature that shows a tuberculin trouble. The veterinary will certainly be able to tell us that, will he?

DR. GILL: Oh, yes, but I really believe there is some misapprehension as to what I meant about the farmers taking the temperature. I said after the work is done by the veterinarian, after he has taken his 18 hours temperature, he has done all he agreed to do, it is always, the safest way to continue taking temperatures for four or six hours longer and also to take the temperatures between the time of injection and the eighth hour. Now we put hard lines on one man to ask him to stay up 24 hours testing cattle, that's a pretty tough job, and if you have ever seen tuberculin testing, it is hard enough as it is, and it is surprising to me that you can get very many veterinarians to make a test for the ordinary price they get, because they could devote their time in another direction which would be more profitable. Now, in the past 15 years—I think Dr. Marshall has done the same—we have slept on a bale of hay, in a haymow, in a wheelbarrow, in a feed box or any old place, and had about 15 minutes sleep between temperatures. It is not an easy job and on nasty, cold nights, with the thermometer 8 degrees below zero, that isn't any rosy job and there is a limit to human endurance. I am suggesting this, that you continue, yourself, after your veterinarian is through.

I might say that when I go to testing that way, I take an assistant with me so that we can change about taking temperatures.

But I simply point out to you the fact that in rare instances, you may have an animal react after the twentieth hour or may have some react before the eighth hour. Those instances are few, but

their number is sufficient to warrant you in always taking those temperatures between those hours and after the last temperature taken by the veterinarian, because the rules laid down, prevail ordinarily in nearly every state in the Union, and they are to take a morning, noon and night temperature previous to injection, and take the first after-injection temperature 8 hours after injection and then continue every two hours till the eighteenth hour. That is not only the legal requirement, but it is an adopted method, it is adopted by competent bodies, livestock and sanitary commissions, veterinarians, people who know about these things and they say it is long enough after injection, the eighteenth hour is long enough after injection to pick up all the cases; but it is not, I just had two cases in the last month after the eighteenth hour, one of them a generalized case. You must expect, we all know that, all veterinarians know and many of you folks know that cows may be so badly diseased, so thoroughly saturated with the toxins of tuberculosis that they will not react. The ordinary dose or even a double dose of tuberculin injected into the animal has little or no effect, it is not shown by any appreciable rise in temperature, yet those are the cases that it is for your advantage to pick up and when you do that, you know that you have done everything possible for the detection of tuberculosis in your herd.

A Member: In a normal temperature of 100, how high would the temperature go in a reaction?

DR. GILL: I might say that out of 7,000 tests in non-reacting cattle, the average mean temperature was 101 1-5, of dairy cattle; of reacting cattle it was just slightly higher than that, a fraction of a degree. I think that 101, one minus and 101, one plus, would be the relation between the reactors and the non-reactors.

A Member: We get a temperature not to exceed 100.

DR. GILL: Oh, no, the normal temperature of a cow runs to 102.

A Member: But sometimes it will be 100 to 101.

DR. GILL: Yes, and some cows have a temperature of 99 2-5.

A Member: In case it shows the temperature of 101, what temperature could they go to and not react?

DR. GILL: If you had a mean temperature of 100 for morning, noon and night and it should go up to 102 plus, the next day, that would be a suspicious reactor.

MR. HUTCHINS: If you keep on taking temperatures long enough, are you bound to get a reaction?

DR. GILL: I think you will, yes.

MR. HUTCHINS: I am talking about the generalized cases not responding in 22 or 24 hours; you mean they will have a rise of temperature after a certain lapse of time?

DR. GILL: Well, they may not.

MR. HUTCHINS: And still be spreaders?

DR. GILL: Maybe you wouldn't get the rise in temperature until the next test.

MR. HUTCHINS: And still be spreaders?

MR. GILL: And still be spreaders. I might make myself clearer on that point, that a cow such as I described as a late reactor may not react to your injection of tuberculin at all within the 24 hours and next time you go back you get it—you give a double dose or she is in a more favorable condition to react, but those are the very rare things to meet with; still you do meet with them.

MR. HUTCHINS: I have heard you remark that the so-called veterinarians of the State of New York, or in other words the certified veterinarians, could be relied upon in making a test. Now I ask why is it, for instance, the State of Pennsylvania's test is recognized in every state of the Union and its territories while the state of New York test is not recognized in a number of our states of the Union where the large sales take place. I notice that they advertise as follows: That you may have your cattle tested 60 or 90 days from the day of purchase. If these test, as you say, are correct, will you please tell us why they guarantee the test in 60 days and why a number of the states do not recognize New York State test and only recognize the Federal test? I am speaking now, you understand, of cases where I know such that has taken place, being an extensive shipper myself and interested in this question, I want to say to you that I certainly don't know where I am.

DR. GILL: Well, I don't know of any state but what would recognize a tuberculin test approved by the State Department of Agriculture of the State of New York, but I do know that the interstate proposition enters into the case when you ship a cow from one state to another. I am afraid that you have the national requirements mixed up with a state requirement.

MR. HUTCHINS: I will say this, Professor; if I desire to ship a carload of cattle to Seattle, Washington, I call upon Dr. Marshall to give me a certified veterinarian, either one connected with the State Department or one that he recognizes as a certified veterinarian, and his papers are taken by every state in the Union, where the State of New York tests are not recognized by every state in our Union. I know of a case, not just recently, perhaps you have read it, where there were 46 cattle shipped from New York to Seattle, Wash. and Tacoma and they were held up; they came there with a State test. Others had complaints that the cattle sent there were not properly tested, although they had the State certificate. They were locked in the yards and told the shipper they would make a retest of the cattle and found that out of 46, 36 reacted. Those are actual facts, because I am acquainted with the shipper and I can give the proper authority on that line. That is where I want some light.

DR. GILL: I do not recall the case, although I have a faint recollection of something of the sort, but that was a case where the test was made by an ordinary veterinarian and a permit issued by

the State Department of Agriculture to ship the cattle, or the certificate was approved by the State but was not made by a State official.

MR. HUTCHINS: May I answer that by telling you this. Do you think it would be legal for anyone to ship a carload of cattle from the State of New York to another state and that that state would recognize that test and it was not made by the proper authorities?

DR. GILL: Why I think it is possible that a railroad company would take a carload of cattle on a certificate from an ordinary veterinarian who may not be a State official, which has frequently happened, and the cattle be re-tested and the State official get the blame for re-testing that particular lot of cattle; or on the other hand the State official may approve an ordinary veterinarian's certificate for the purpose of shipment; a man may be of good repute, licensed all right and the reason why the State Veterinarian would not approve the certificate, and the fact that re-acts might be found after the State official had approved the certificate would be no reason for refusing the State Veterinarian's test.

MR. HUTCHINS: Suppose the cattle were tested and six months afterwards were re-tested and all fell down and the State of Washington was obliged to pay for those cattle because they had been in the State a sufficient length of time, would that be fair to the State of Washington?

DR. GILL: I am getting in a little deep water regarding the affairs of other states; I know all about our own State, but I am afraid I know very little about the State of Washington. But I do know that the interstate laws do affect the shipment of cattle from New York to Washington State.

MR. REINHOLD: I have had experience along that line and find that I have had no trouble at all in sending cattle to Washington from this State by getting the State Board, or a certified man that the State Board recommends, and they accept that certificate all right. Now isn't it a fact that if a man would want to be dishonest, as you suggested not long ago, that he would make his own test, although it is not legal? For instance, we will say here would be a breeder who would call in the State to test his cattle, and before the man arrived, inject tuberculin, or do so at different periods, could the Federal Government even then pick out the reactors, that is the true reactors, in that case?

DR. GILL: Now we are getting back to our subject again.

SECRETARY CRITCHFIELD: Dr. Gill was invited to come here to discuss the suppression of tuberculosis from a scientific point of view and not from a legal point of view, and I am afraid this colloquy is leading him away from the question he came here to discuss.

The CHAIRMAN: It is the only number we've got; I invited everybody to pitch into him and now I want them to do it.

SECRETARY CRITCHFIELD: I shall be very glad to have every question put to the doctor that it is possible to put to him as long as the questions are along his line; but he was not invited here to discuss questions of interstate commerce, either in cattle or any other product of the farm.

The CHAIRMAN: Well, he can settle those by saying he doesn't know; I don't want to limit this discussion.

SECRETARY CRITCHFIELD: Aren't we losing time by having questions of that kind put?

The CHAIRMAN: We have got all the time there is. This thing is just commencing now, we are just getting thawed out.

SECRETARY CRITCHFIELD: Well, I wanted the opportunity, inasmuch as I invited the doctor to come here, I wanted the opportunity to let him know that I did not suppose that he would be subjected to that kind of interrogation, differing from his professional line. I am glad to say that I believe he is fully competent to take care of himself; but I should be very glad indeed if the discussion should be confined to the line he was expected to discuss.

The CHAIRMAN: We appreciate the kindness of your heart in your efforts to shield him, but he has got to take care of himself and he can do it. Let's have it interesting. I know he appreciates these questions. But, gentlemen, if you can, make your questions as brief as possible, because when a real long question comes up, it's like the question of a Philadelphia lawyer, two or three pages long and by the time you get to the end you don't know what you are asking. Make your questions as brief as you can. It is not necessary to put any legal question to him.

SECRETARY CRITCHFIELD: Is it the opinion of the Chair that it is the proper thing to conduct a colloquy between the speaker and a member of the audience for half an hour?

The CHAIRMAN: It seems to be the proper thing to conduct a colloquy between the Secretary of Agriculture and the Chair.

MR. STEVENSON: I would suggest to the Secretary that those that don't want to indulge in the colloquy might retire.

The CHAIRMAN: This is all good natured; Dr. Gill is here to enlighten us, but make your questions as pointed as you can.

DR. GILL: What the Secretary said put me in mind of a story. A tramp came along the road and struck a fence that enclosed a back yard, and inside the yard was a dog, and in the doorway of the building was the lady of the house, and the tramp started for the door and the bulldog rushed at him and looked as if he would eat him up. The lady says, "Come in, my good man, that dog won't bite you." The tramp says, "You know the dog won't bite and I know it won't bite, but how about the dog?" (Laughter). That puts me in mind of the question. I feel that the gentleman had a perfect right to ask me that question for the reason that I am a State official myself of the State of New York. And I was going to

suggest that if the gentleman will give me his card, I will make some inquiries regarding that and be in position to tell you positively whether that is the case or not. I am afraid you have been misinformed in one or two particulars on that proposition. Not only am I a State official, but I am also a deputized Federal agent in the State of New York for the purpose of testing animals and horses for Canada and other places, and I know that the interstate Federal law plays a very important part in the shipment of cattle between states.

Now, we will put the car back on the track, and that leads us right up to the question, how do we know, when we buy cattle that they are in a proper condition to be tested? Or, in other words, how do we know but what the cattle have been plugged—I am using terms that you will probably recognize—by being plugged, we mean that they have been injected with tuberculin so as to retard or prevent a subsequent accurate test:

Now let me tell you the practice. It's no reflection on dealers or breeders present. Let me tell you the practice in New York City and New York State. Many dealers know where there are applicants for the purchase of cows; they will buy several carloads of cows; they have them in their barn; they will send John Smith a letter saying, "Come along with your veterinarian, we have 100 cows; test what you like and take what you like and leave what you like." John Smith comes with his veterinarian and they test say 50 cows; they only want 25, but they are going to test 50. They may get a few reactors; they take 25 of non reactors; take them home. The cows are gone, the purchasers are gone and the man has 75 cows left. He sends out another letter to John Jones and says "You come along, I have 75 cows; bring you veterinarian with you, test what you like, take what you like and leave what you like." The veterinarian tests 35 cows. He tests the same cows probably that were tested before, because he picks the cows out according to their physical appearance and the judgments of expert cow men don't vary very much. If Smith picked out what he thought was a good cow, Jones would come along and pick out the same cow, so Jones picks out the same cows that Smith has previously picked out and tested, and retest those cows with the result that he gets no reaction on a cow that reacted to the original test, and buys that cow and takes her home with him. He has got a reactor, because this cow was injected with tuberculin only a week before he arrives. He goes away with his cows and a third man is written to, and in that way a dealer has been known to get rid of his entire herd.

A Member: If they find a reactor, why don't they brand that reactor. We go to the State of New York and mean to be as honest as we can and buy the second load of cows and get a reactor and get a clear paper for that cow and take her home and spread it all around.

DR. GILL: Our law requires that all reactors shall be branded, but it only goes to show you—I might go back and say this, that if you rid your herd of tuberculosis, there is only one way you are going to get it and that is by bringing in new cattle, and that is the way that you do get it and that is the way we get it even in our

certified dairies. They buy generally on tests, but they bring it in with the cattle they purchase.

A Member: I don't want to take up any more of your time; just one more question. In the State of Pennsylvania, if I am correct, if a cow is a reactor, the State Sanitary Board keeps a careful eye upon that animal and she must be isolated and quarantined. She cannot be removed from that quarantine unless you apply to the Commission of the State Sanitary Board. Now, if the State of New York has a law that permits those reactors to go back in the herd, is it any wonder that a number of states have quarantined against her.

A Member: It looks to me as though it is more the dishonesty of the seller of the cattle that damns the tuberculin test rather than the unreliability of the test. (Applause.)

DR. GILL: Yes, I believe that's true.

MR. STEVENSON: You stated that the law in New York State required the branding of reactors; I suppose you are well aware that in some of the herds where Federal inspection and supervision has been going on for many years, they do not obey the law, if that is the law?

DR. GILL: Well, I presume they don't, but of course you understand that men still commit burglary and murder; there is a law prohibiting it, but still they do it.

MR. STEVENSON: I stated a herd under Federal supervision and regularly tested by Federal authorities, where they don't brand them.

DR. GILL: Well, that may be so, but I know that our good friend Dr. Marshall and Dr. Gilliland don't do that, I can vouch for that, if that's any help, but we have people that do it.

But to get back again to our suppression proposition— the greatest trouble is to keep tuberculosis out of a tuberculosis—free herd. If you do eradicate tuberculosis out of your herd, how are you going to keep it out? There is only one way, in my mind, there is only one sane way in my mind, and that is to breed your own stock. Breed your own stock; it is going to be profitable after a while.

MR. STEVENSON: Most of us will be dead or bankrupt, though, before that happens.

DR. GILL: No, you won't. I have been a close and keen observer of conditions for a long time—I am not going to say how long—I have know of instances where a dairyman was mortgaged over his head, no possible chance for him at all, only it was the friendship of his friends who allowed him to continue, taking a chance and a very long chance with him. He had 75% of his cattle wiped out on the first test, but he followed the rules and he was honest and this is only five years ago, and to-day that man owns his farm, owns two farms, owns about 80 head of cattle, clear, and made it all on certified milk. Now I tell you that when a veterinarian comes into your farm and he finds that you have got ten reactors, you say, "Well, what does that mean?" That means that you have got ten tuberculous animals, ten tuberculous cows and they have got to be gotten rid of.

Well, that is appalling to that man. You know it is a terrible thing to lose all that stuff. He is going to stretch his conscience; probably he is going to say, "Oh I won't brother with this tuberculosis testing, I will just keep my herd and breed them along and sell the milk and it can be pasteurized, that will kill all the bugs in it," and he does continue along but he does not make any money. He is going to stand still, he is going to be right in the same rut. Suppose you are a breeder and you have got a tuberculosis free herd? Why, you can sell any and everything you have got on your place at a good profit; and if you don't believe it, any of you that have got cattle of that kind or even calves of that kind, let me know, I know where to place them, I know where they need them and will pay the price for them if they have any tuberculosis. There is where the profit is going to be, and big profit; I can see it coming right now. You are paying to-day $125 for a good tuberculin tested cow; you are going to pay $200 for a good cow pretty soon.

MR. STEVENSON: Do you known that in your own State of New York, under Federal supervision, regularly tested once or twice, I think a year for five or six years, there has been a herd of cattle maintained in the endeavor to establish a tuberculosis free herd, and they failed absolutely? Do you know that to be true?

DR. GILL: The government had not anything to do with it.

MR. STEVENSON: The Federal Government.

DR. GILL: The U. S. Government?

MR. STEVENSON: Yes sir, the Federal Government. And don't you kown that that has been an absolute failure?

DR. GILL: No, I can answer this way; I know of a herd where several veterinarians have lost their reputation, but it was not through any fault of theirs. The trouble is that the owner of this herd and the manager of the herd knows more than the veterinarian and everybody else connected with it, and the result is he has had tuberculosis in his herd for the last 25 years. Now they want to be certified, they have gone over into another concern and the Milk Commissioner of the county society, which I have the distinguished honor of being connected with, will be obliged to certify to this herd and you can bet that tuberculosis will be cleared up or they won't be certified.

Now the trouble is that they don't know what they ought to do, and when you see 25, yes, 30 two-year old Jersey heifers surreptitiously sent to slaughter—and I run across them in the stockyards, and a lot of Jersey heifers, two year old Jersey heifers—it would be apt to attract anybody's attention. They attracted mine and I traced them to this farm, 25 two year old heifers sent to the stockyards to be sold for slaughter because they were reactors.

MR. STEVENSON: I do not feel at liberty to mention names but I will state that this herd has been certified as a State accredited herd or a Federal accredited herd and yet they have not been able to keep in their barns any non-reacting cows or a very small percentage over 25 years of age. That is the State accredited herd that

Mr. Tyson suggests and yet he writes to me that he would not give much for the tuberculin test applied to interstate shipments unless he knew that the animal came from a State accredited herd.

DR. GILL: That is a new term to me—State accredited herd.

MR. STEVENSON: Tubercular-free herd under the State credit.

DR. GILL: Well, the State does not supervise them in that way; they simply test the cattle under the law and appraise and slaughter the reactors, you know.

A Member: Was that herd kept up by raising or by purchasing?

MR STEVENSON: By raising except for purchase of a very rare, occasional bull.

DR. GILL: As I said before, the greatest danger is in purchasing cattle. That has been my experience all along, where they buy new cattle, we are very apt to have the herd reinfected, so for the reason it is very necessary, in my mind, to re-test the cattle every six months, and in that way why you certainly can keep the reactors down to a minimum.

MR. HUTCHINS: I know the herd that Mr. Stevenson has reference to in New York State; this farm. It is a large herd owned or was owned by a man of unlimited means.

DR. GILL: Was his name Lowe?

MR. HUTCHINS: No; also he had a manager there on his farm, which I don't want any disrespect to go out to, he is a very able man. The Chairman knows him as well as I do. Also they put out another farm that they put the reactors on: they invested $1,300 to $1,500 in a pasteurizing outfit. They have been under Federal supervision, now, I judge, about three years. That is the farm Mr. Stevenson has reference to and I well know it because I took it out of the Federal supervision less than a year ago. Their success has not been practical.

DR. GILL: I know of the herd but I cannot recall it. It is always a very discouraging proposition to rid a herd of tuberculosis and come back a year later and find several reactors. But, as a general rule, you can always trace the origin of the infection or of the re-infection, you can always trace it; there is some reason for it. But if the usual precautions that I have suggested so far as tuberculin tests are followed, it minimizes these possibilities of a tuberculous animal escaping the test, and if I were the owner of the herd, I would never introduce a strange cow into that herd unless I was absolutely sure and had made at least two tests on that animal before introducing it into the herd and observed the animal; any cough or anything that would excite suspicion on your part that the animal was not just right. You must understand that we have what we call a typical reaction, that is apparent to most any one. You pronounce a cow, giving a temperature of that kind, tubercular right on the face of it, but it is the non-types, as I call them, these irregular reactors, these late and early reactors, these reactors that

are only classed as suspicious, those are the dangerous animals. I would sooner condemn a suspicious reactor than I would a typical reactor. That has been my experience and there is where I have made my mistakes.

A Member: Might I ask what a typical reactor is? What is the normal temperature of the cow and when they react, where does the temperature go?

DR. GILL: A typical reaction is where you begin with a normal mean temperature of over 102, a temperature that averages not over 102.

MR. HUTCHINS: The reason I spoke in this discussion was, that I was just wondering if we were not a little lax in continuing the temperatures to test the dangerous stop. I don't belive we are going to catch the spreader, the dangerous animal, with an 18 hour test.

DR. GILL: I will take that up later. Eight hours after the injection I notice that the temperature rises, it may be up to 103. The tenth hour it is 103 and a fraction. The eleventh or twelfth hour it is 104; the fourteenth hour it is 105.2; the fifteenth hour it has reached its maximum, we will say, at that hour; it is the same temperature a little later; a little later it is just a trifle lower, and then it begins to drop and probably resumes the mean normal temperature or a temperature equalling the mean normal temperature, along about the 24th hour, maybe the 22nd, maybe the 20th hours, but it represents a curve from the normal, 102, to above 104. Anything above 104 I call a typical reaction, from 102, the average mean. That is what I call a typical reaction.

Now suppose you get a case that begins at the 6th hour, goes up a degree, comes down and runs along to the 15th hour and then she goes up to 103.2; then she comes down again. Now that is not a typical but a very suspicious animal. If you cannot find the cause for that elevation of temperature, it is reasonable to attribute it to tuberculosis because there was no such temperature the day before when you checked it up and got the temperature, and if there is no other condition to cause that temperature, it is safe to attribute it to tuberculosis. And those are the dangerous cows, those are the cows that get you and veterinarians and your herd and everybody in trouble; those are in the cases that should be immediately eliminated, if not killed right off. Get the cow right out of the herd, isolate it somewhere; and it is surprising how these generalized cases give irregular results. Those are the cases that give the irregular results, and those are the cases that they want to get out of your herd. Now I will take up your question.

MR. HUTCHINS: It was this, the reason of the non-success of the tuberculin tested herd was that it was infinitesimal—not picking out the suspicious cow.

DR. GILL: That was the reason I pointed out the necessity, the advantage and the value of taking the temperature every two hours after injection, because, in rare instances, of course it is not the general thing, you are going to do that you know but it is just the rare case that will keep on breeding the disease in your herd, just that

rare case that you want to get out, that you can only pick up—I won't say only pick up, but do pick up between the 20th and the 24th hour temperature.

MR. HUTCHINS: I know two instances where two cows, after testing for several periods, gave no reaction. Finally they took the two cows out under suspicion, that did not react to the test in generalized cases; when they came to the younger one that had been feeding on milk from the herd, they got a reaction. Now if they continued that, would not they pick up those two spreaders. There were two cows in those well bred herds.

DR. GILL: It is a well known fact that tests repeated at short intervals will cause the reaction to come very late; therefore cattle that have been tested within a couple of weeks or even a month or two months should not only have the temperature taken longer than the 18 hours, but should be injected with an extra amount of tuberculin to counteract and offset the effect of a subsequent injection of tuberculin.

MR. HUTCHINS: These were tested every six months.

DR. GILL: But I know as a fact that where, for example, the cows are tested on purchased and then, a month later tested at home, making another test say a month later of those cattle, you are not apt to get a reaction until very late. Of course, for the reason I have set forth before, that the injection of tuberculin immunizes in some way or other the animal and retards the action of the second tuberculin injection. I don't know that I ought to take any longer, and thank you for your attention. (Applause).

The CHAIRMAN: Now, gentlemen, I am not a veterinarian, but I want to say one thing that will help you to keep your herds free from tuberculosis, and that is, raise your calves in the open air and get all the constitution and ginger and gimp into them you can. Never mind these tight calf barns, knock the end out of them and let your calves live in the open air. That has been my experience and I believe it is worth a whole lot in the line of preservation. Fresh air never hurts any calf.

A Member: A year ago we had our herd tested and we had a Guernsey bull that reacted. I couldn't do without him and I asked whether we'd keep him under quarantine. We got that permission and we kept him in an open shed, open to the south, and six months afterwards, the first of July, he was tested again and there were no signs of tuberculosis in him, but they made the most severe test in every way that they could. They tested him in three or four different ways and could not get him to react.

The CHAIRMAN: Couldn't get him to react at all?

A Member: No sir.

The CHAIRMAN: The only trouble with that testimonial is, I am afraid it is too good.

A Member: I only mention that from the fact that I think we keep our herds too close and if we give them more fresh air, we will have less tuberculosis. Dr. Marshall is aware of that.

MR. STEVENSON: I am afraid that you give too much credit to your theory of fresh air. It seems to me that this statement is a condemnation of the tuberculin test. This bull reacted at the first test and did not react at the second, yet when we have cattle that do not react at the first test but do react at the second, when they are tested after shipment, we say that the man that shipped them was a crook; why not attribute a little of this failure to the well known limitations of the tuberculin test?

The CHAIRMAN: You are all entitled to your opinion about this matter of the test and about this matter of the rascality of the other fellow, and he is entitled to his opinion about you and no doubt in some cases he has it. I was listening the other day to a commission man in the city of Pittsburgh in the livestock market—just to show you how things go—and he was kicking about these veterinarians being a set of grafters "Oh, there's a graft out somewhere;" the foot and mouth disease was what he was talking about, and I said "I heard two men in Columbus last week say you commission men are a set of grafters." He didn't like it a bit. You see he was wrong and I say maybe you are wrong about these people; it is mighty easy to accuse the other fellow of being a rascal when things don't just turn out your way. I think we ought to have a little Christian charity, sometimes for a man who tries to be honest, at least. I know there are rascals in the testing of cattle; you all know it. I think there is a man in this audience that tested cattle in New York along with several alleged veterinarians up there and I think he was the only man in the whole bunch that had a thermometer, but the test sheets showed all right. These other men were not doing their duty.

The question is how are we going to control this disease? That is the great question. I would like to have these veterinarians tell us in just a few words how we are going to control it. I say to all you cattle raisers, raise every thing you can in the open air as much as you can. Don't worry about a calf getting cold, it is not going to get cold, but it will get cold if you keep it in a tight barn and then let it go out and so will you if you wear your winter underclothes and then go out without any underclothes on. Knock the end out of your calf barn and keep the fresh air and dry air in there. You can't keep it in there any other way; that is one way to keep out tuberculosis when you are raising cattle.

Now these veterinarians, I want to ask you gentlemen. What you think of our Pennsylvania law? Don't you think we have got about the best law that can be enacted on this subject?

MR. REINGOLD: I want to say this, I do believe we have the best tuberculin law in the State of Pennsylvania of any state in the Union; it is recognized throughout the country as such. Now there is so much to be said on both sides of this question that it is almost impossible for anyone to determine exactly were we are at. Not long ago I purchased a Holstein herd and had them tested, with the con-

sequence that they all reacted with the exception of one cow and four heifers of the age of four to six months. Those heifers were fed with milk from these three reactors and they were the only ones that were not reactors, and still we are told to pasteurize the milk to prevent tuberculosis spreading to the offspring. This case is on record, and as I have said before, I believe we have the best tuberculin law of any state in the union, and I have heard more to-night and enjoyed it immensely. As the old saying is, it is difference of opinion about horses that make horse races, and we have with us to-night a gentleman who has studied the other side and I believe he can give us facts and we can simply compare them and that is what I would like to hear and I think we should ask Mr. Stevenson to give us a little talk on the experience he has had.

The CHAIRMAN: Gentlemen, we are going to give Mr. Stevenson the floor for a little while and then we are going to give it to anybody else that wants to talk, so I am going to ask Mr. Stevenson to be brief, and I know he will be. Mr. Stevenson I will give you five minutes.

ADDRESS OF MR. STEVENSON.

You know I can't even get under way in five minutes. I have no desire to hold anybody against their will; but I think this question is of such importance to the breeders of cattle, that we ought to take a night, if necessary, in order to acquire any information about it that we can. There is one thing to be said against the advocates of general tuberculin testing as now applied under the law—if it is a good thing and will accomplish the purpose of eradicating the disease or of keeping it out of our State, why not apply it to every herd in the State—get rid of all the reactors at once? Now, by not doing that, they admit that it will not accomplish what they claim for it, that it has absolutely failed to accomplish what they claim for it, and I am going to cite you one or two little cases, only, because of the limited time at my disposal. An institution in my county between January 1, 1913 and August, 1913, built a new, modern sanitary barn; lots of sunlight, twice as much as there would be in this building, bought in the adjoining county 97 cattle, subjected them to the tuberculin test by veterinarians of their own selections, one of them a relative of our State Veterinarian; not a reactor was found; all were pronounced sound. They were driven across the country about 80 miles, assembled in this new, modern sanitary barn, kept free from contact with any other cattle. There was no known method of known communication of the disease, and in April, 1914, they were again subjected to the tuberculin test by another veterinarian and 36 reactors were found. They were slaughtered and pronounced by the veterinarian, a very competent gentleman and, I think, thoroughly honest, as I think Dr. Marshall is thoroughly honest—found by him to show lesions of the disease. Four others, not reactors at any of the tests, these two prior test were slaughtered later and

three of those were found with lesions of the disease. They were held until October—the remaining 57, again tested, and, gentlemen, there are 22 left. There won't be any left after the next test or two.

Now that is the method of eradicating tuberculosis, but you eradicate the herd and annihilate it when you do it. Dr. Moore had precisely the same experience reported in an article in the American Veterinary Review by Prof. Hastings with whom I had my first controversy in Hoard's Dairyman. Ninety seven animals were subjected to a semi-annual test for four years and out of the 97, 19 were left—a pretty good showing too.

Where are the cattle coming from? Where are you going to get your milk from? Where are you going to get your future dairy cattle, if you slaughter the animals that react? And a great many that react are found to be perfectly sound, found to show no lesion of the disease after reaction. I have right here in an envelope—if I had all night, I could give it all to you—a report from our State Veterinarian as to the animals tested—animals imported into the State of Pennsylvania and tested in 1914 at Pittsburgh, Lancaster and other places—27,000 animals, is my recollection, of which number 305 were found to be suspicious. That is a class that don't exist when they test our animals for interstate shipment; they are either reactors or non reactors, they are not suspicious. Three hundred and five were suspicious and of that 305, on the re-test, a large portion were found to be sound. Two hundred and sixty reactors were found and slaughtered. Fifty-three showed negative autopsies; 20% were sound according to the post-morten examination.

I want to qualify that a little bit; I will admit that in our autopsy the veterinarian may not find physical evidences of the disease in the post mortem and yet the animal may have had the disease. A layman's knowledge don't go quite as far as that of some of these pseudo scientists who use a miscroscope and so on. All honor to the fellow that is an honest investigator, as was Prof. Kopp, but I despise the man who is not an honest investigator and does not give us the actual results of his experiments—all the facts and factors that make them up; not his conclusions, as did Dr. Moore when he made the stockyards in Chicago and became offended at me when I made a contradiction because I did not publish his letter. I did not publish his letter because it had four flat contradictions in it. If the test did the business, we would all welcome it with open arms, as I did in my graded herd until I had proved that it was a failure. Animals tested in January were re-tested in May, when they said sufficient time had elapsed to give them a second test, and out of 12 animal reacting in January, only 8 of that 12 reacted in May. It is accurate? Were they sound or were they unsound? How are you going to tell? This we know—those that have been stamped as reactors and some of these gentlemen say ought to be branded, have gone into barns under the reacting of Bang's system, stayed there nine or ten or eleven or twelve years and it apparently perfect condition, performing all the functions of the dairy cow, four good quarters to a mighty good udder, making high official and semi-official records, producing a calf every year, and lived there till they were 16 and 18 years way past the ordinary age of the common dairy cow when she is discarded and goes to the scrap heap. That I have

discovered in two reacting barns, one maintained by the State of Pennsylvania at Media, and I say we ought to demand, as citizens of Pennsylvania, a book, if it's as big as Webster's, the Encyclopedia Britannica or the Century Dictionary.

We ought to have a detailed report of everything that happened at Media. It rests with us; we can get it if we demand it, and the first appropriation that ought to be made to the Livestock Sanitary Board ought to be made for the purpose of giving us the facts they have been unearthed. I have a lot of respect for Dr. Gill, he has handled this thing in a very moderate, fine manner. If we could get all the veterinarians to apply the tuberculin test as I believe Dr. Gill would apply it and as I believe that Dr. Marshall in person would apply it, we would welcome it, but you cannot find them, they are not on the map. The editor of a leading dairy paper stated "I think, that we'd better call off this tuberculin test." There are a good many institutions turning out young men to take a squirt gun in one pocket and a bottle of tuberculin in the other and go around pretending to eradicate tuberculosis, but they don't eradicate it, that's the trouble. Prof. Hastings, a very fair, broad minded gentleman, with whom I had my first controversy, came back to me in a letter and said the tuberculin test is not 98% accurate, the most you can claim for it, in my experience, is about 86%. He says the Tuberculin Congress stated that tuberculin will not always cause a reaction when the disease is in incubation; when the disease is started, and, third, when the disease is extensively generalized. But that Tuberculin Congress did not add, what Prof. Hastings did, that it often condemns perfectly sound, healthy animals. I will admit that in that case the veterinary who made the test probably read the signs wrong. The veterinarian may mistake sometimes a rise in temperature due to another cause for a reaction; I think that has often been done and that Dr. Gill will agree with me on that proposition.

How are you going to eradicate it from your herd and have your tubercular-free herd if the disease is as easily communicated as Dr. Gill says—blown in on the atmosphere from your neighbor's pasture, blown into your barn or carried in by some person? How are you going to have your tubercular-free herd unless the tuberculin test is applied to everybody, and then, if you do that and pay for the slaughtered animal, old Pennsylvania will be in the bankrupt list and so will New York. This thing has cost us in Pennsylvania, in appropriations—I haven't been able to find out how the money was all spent—since 1895 when the first Act was introduced, about $1,750,000 in appropriations to the State Livestock Sanitary Board. I make the assertion that we have derived no benefit in preventing the introduction of tuberculosis into the State of Pennsylvania from all our laws and all the appropriations spent by the Livestock Sanitary Board for that purpose, but we have given to a lot of honest breeders of pure bred cattle, a bad reputation, which we had no right to do. In place of attributing the reaction, when cattle are tested after arrival, to the true cause which in most instances is the acknowledged limitations of the test, they say that that man was a crook. I have heard the former President of the National Holstein Association, whom I believe to be just as honest a man as I claim to

be—and by the way I claim to be just as honest a man as stands in the State of Pennsylvania, that's my own opinion of myself, you know—I think it is an outrage to state, because an animal reacts after shipment—and I never had such a case, I am not hurt yet, personally, every animal I shipped has pleased my customer and he has come back for more, there is one of them here now that came after a second one, and not one has given me any trouble, but I know that my experience will probably be that of other men, so I publish in the back of my catalogue, "Send your own veterinarian to make the test; you assume the moral responsibility for the incorrection and inaccuracy of it; don't take her if she reacts, but leave her on my premises and nobody is going to brand her, she is going to stay there as mine.

We have been humbugged as much by immature legislation on a subject we know so little about—I don't say that these veterinarians are humbugging us, I don't say that there isn't anything of truth in the discovery made by Kopp of this tuberculin lymph, because I am inclined to think that where all the care and judgment and intelligence so ably discussed by Dr. Gill and so very ably discussed by Prof. Hastings in a bulletin recently issued by the Wisconsin Experiment Station. I was glad to hear Dr. Gill, if I understood him correctly, state that this is purely now an economic question for the breeder himself, that the protection of the consumer of marketed milk is assured now by pastuerization; is that about right, Doctor?

DR. GILL: That kind of milk, yes, pasteurized milk, but they still want raw milk.

MR. STEVENSON: Do you still claim, then, that the tuberculin test is a protection which the consumer of milk may demand legitimately as a protection against tubercular germs in the milk?

DR. GILL: Yes, unquestionably.

MR. STEVENSON: You know that Prof. Hastings, throughout the Milwaukee fight, takes the contrary position and says that he thinks that any city of any considerable size will make a mistake if it passes an ordinance that requires the tuberculin test for milk, and I think that New York City, with their ordinances of 1913, that has changed every time they met, that have got Class A and Class B, with blue ribbons and red ribbons is about the most laughable thing imaginable, and every time they have touched it they have scared some customer from using the most wholesome, fresh and cheapest food ever produced, and they ought to be laughed off the face of the earth.

MR. HUTCHINS: It seems to me that we give too little attention to the owner of cattle who will not clean up the reactors that have been taken from his herd and will not keep animals out of his herd until he is absolutely sure they are not infected with tuberculosis; and I think all the speakers do not take that into consideration. I think from my own experience in breeding and buying cattle, that that is the most important thing in eradicating tuberculosis from the herds of this country.

DR. GILL: I just want to say that Mr. Stevenson did not dispute the fact that there was a cause for tuberculosis and that tuberculosis must necessarily have a cause; but I also regret that Mr. Stevenson does not live in my neighborhood, because, if I was Dr. Marshall, Mr. Stevenson would be the man I would get and get quick; I think that we could get him; I think that I could convert him to my way of believing. I can safely and honestly and without any fear of contradiction, produce records to substantiate my statement that I can take a herd as a unit, rid that herd of tuberculosis and keep it out of that herd as a unit. It is a case of multiplication with a county or with a state, and it can be done, if done properly; but Mr. Stevenson has given us the question and answered it in the next breath. He says that it would devastate the cattle. That has always been the answer; that is the answer that affects this whole proposition. That is the answer that has prohibited the real, true method or the application of the read, true method of eradicating tuberculosis, it has been the legislator.

That is where they go with their influence and prevent just such disposition of tuberculous cattle and say that if we are going to eradicate tuberculosis we will wipe out the cattle. That may be so, Mr. Stevenson may be right; my experience has been with herds of cattle kept in ordinary condition we get 25 to 75%; we don't get that any more, it is a rare occurrence to get that percentage. I have got a herd of cattle in New York State, three hundred and some odd cattle, that had two reactors in five years; that's the Salvey herd. If you had your herd near me, I could prove to you that I could eradicate tuberculosis from your herd if you did as I suggested, and I could convert you from your present state of mind over to the real true way of thinking.

A Member: You don't know Mr. Stevenson.

DR. GILL: I know him and he is just the man I would like to get, because the game would be worth the trial.

MR. STEVENSON: My pocketbook might not hold out.

DR. GILL: I know nothing about that.

MR. STEVENSON: I visited this farm a few weeks ago, where this kind of thing has been going on under the most favorable conditions, unlimited money, a reacting farm that cost $100,000 the farm and the equipment, three-quarters of a mile away from the sound barn; 104 animals in the sound barn after several years trail; how many were over five years of age? Just five. In the reacting barn there are animals 18 years old apparently sound, performing all the functions of a dairy cow, making high official records. I'd rather have the high producing cow. if I knew she had tuberculosis, than have some of the skates on some of the farms in Pennsylvania that are perfectly sound and that you can't get tested because you haven't got enough men to do it; and what is the use of my trying to keep my herd free from tuberculosis when my neighbor turns his old skate loose on one side and another neighbor on the other side does the same thing, and the fellow up the stream uses the water? I believe that for every disease to which the human race is heir, under

right living Nature sets up a remedy that finally keeps it in the balance. That seems to be the history of tuberculosis in many families in the human race and it probably would be repeated in the bovine race. Now another thing—

The CHAIRMAN: I don't like to throw anybody off, but I see two or three other gentlemen who want to speak a moment.

MR. SHROAT: The University of Wisconsin has recently issued a bulletin showing where they have treated their herd as a unit and no evidence of tuberculosis has been found in 20 years. I also cited an instance this morning where a herd in New York State which I think has one of the most valuable sires in the country, had eliminated tuberculosis by the use of tuberculin and the Bangs system. The offspring, 200 in number, have been subjected to travel and the official does of tuberculin has not reacted. Those are two instances where individual herds treated as a unit, have been permanently cleaned by the use of tuberculin; and further than that, Governor Hoard answered Mr. Stevenson to the effect that his herd had been cleared of tuberculosis and kept so by the use of tuberculin for 14 years. Those are three instances. Do we need any more if things are carried out intelligently?

The CHAIRMAN: How many gentlemen here are connected with herds cleaned up by the use of tuberculin.

(Seven responded).

MR. STEVENSON: How long since you had any reactors?

A Member: I wish to state that three years ago I took charge of a herd where we had 90 head of cattle. Dr. Marshall sent his veterinarians there; we started in to testing those cows. We didn't take a temperature and then go to bed, but Dr. Marshall's men and I stayed on the job till we made a thorough test. They threw out 68 head and I killed every one of those cows myself, with the help of Dr. Marshall's assistant veterinaries, and every one of those cattle were tubercular, some of them very bad, some of them full, as Dr. Gill says, of those cherry things through them and others hadn't it any larger than your thumb nail. There was tuberculosis there. That left us 22 head. Those cows have been tested, I think four times since, isn't it, Dr. Marshall—those 22 sound cows we found in our herd have been tested either four or five times since, and in the meantime I killed about eight of them for beef, and not one of those cows have reacted nor was the one killed for beef found to have a particle of tuberculosis in her. Now I consider that the test was tuberculin is one of the best modes of eradicating tuberculosis, but you must do it honestly. When the veterinary comes to your place, you stay on the job with him until he gets done.

MR. STEVENSON: You began testing six years ago, and when did you make the next test?

MR. BOWMAN: (of Philadelphia): Every six months.

MR. STEVENSON: How many reactors did you find on the second test?

MR. BOWMAN: None.

MR. STEVENSON: How many on the third?

MR. BOWMAN: Not a single case.

MR. STEVENSON: You have got me guessing; why didn't they do that in the Hillside herd?

MR. BOWMAN: Dr. Marshall has the records to show that what I say is true.

MR. STEVENSON: I wlll give you another one of Dr. Marshall's. A herd was tested every six months for a year; they couldn't get any reactors but kept losing calves from tuberculosis. They finally got discouraged, but sent the milk down and couldn't find the germ. They fed the milk to pigs, but couldn't kill the pigs. Finally they fed it to guinea pigs and it killed the guinea pigs. They killed one of the cows and found that she had localized tuberculosis. Did they eradicate tuberculosis from that herd by the tuberculin test? No sir, they did not.

MR. BOWMAN: Last year I killed over 75,000 pounds of pork fed from the milk of these cows, and those hogs are inspected by the city inspectors every week and not a tubercular hog has been found on our place.

MR. STEVENSON: Dr. Marshall made these tests himself?

MR. BOWMAN: His assistant made them.

MR. STEVENSON: Why don't he send us one of those assistants?

MR. BOWMAN: It's your fault if the veterinarians making the test don't stay on the job.

MR. STEVENSON: I've been on the job long before you were born.

MR. BOWMAN: You ought to stay on your job and see that those men keep on theirs.

The CHAIRMAN: Will some gentlemen please go out and get me a club? This man has touched on one thing that is very important and has not been brought up here before. It is a fact that tuberculosis in hogs is getting to be quite a problem with our packers. One firm, I think the Pittsburgh Provision Company, had 68 out of 100 carloads condemned on the killing floor on account of tuberculosis and, it is a fact, that packers are fighting shy of hogs from certain districts where no attempt is made to keep them from from tuberculosis. If we allow our animals to become infected by tuberculosis or foot-and-mouth disease, or anything else to the extent that the packer loses so much money that he is uncertain, when he buys them, he is going to demand that he will pay for no animals until they have passed inspection on the killing floor. Do you know what that means? That means that we lose the cash market that we now enjoy for livestock. One of the greatest things in our whole system of agriculture, is the cash market we enjoy for our livestock. Live-

stock is cash; you take it to the stockyards, your commission man sells it, he hands you the cash and you go home with it or the equivalent of the cash; but suppose the packer is losing so many hogs or cattle or sheep from disease that he won't pay until they have passed the Federal inspector? Then there is trouble right away and you don't get the cash except subject to inspection. Then you go home and try to take it out of the man that fed those hogs and there's another row, or maybe he bought them from somebody else and then there is another row. This matter of disease is a great commercial problem; we have got to wipe it out or lose our cash market for livestock in the stock yard. There's no two ways about that; we cannot continue to tolerate it. When Dr. Pearson started this campaign against tuberculosis in Pennsylvania, the Pennsylvania Legislature offered him money enough to do exactly what Mr. Stevenson wants him to do, test everything in the State. The Pennsylvania Legislature put up the proposition to him. Why not test everything in this State? Dr. Pearson was wise enough to know that this matter is an educational matter which has got to be threshed out by the exchange of opinions such as we have here to-night, and he said, "No, let's make it voluntary"; and I don't believe from that day to this that Pennsylvania has ever been able to keep up with its testing; there are more requests for testing herds than can be complied with in the State of Pennsylvania. Let me give you one experience—I'm talking too much too. I bought a first prize bull at a State Fair outside of this State and tried to obey the law of Pennsylvania, so I bought him subject to test. He was tested and fell down. Now I want to ask Mr. Stevenson if he would take that bull into his herd; would you?

MR. STEVENSON: After it had reacted?

The CHAIRMAN: Yes.

MR. STEVENSON: Not without quarantine. I would not put it in with the sound herd; I don't want you people to say that I say there is nothing in the tuberculin test; I don't say that, but I do say there is nothing in it as it is now applied under the law; it may be largely due to the inefficiency and incompetence of the men who generally applied it; I am not talking about experts like Dr. Gill, Dr. Marshall and Dr. Hastings.

The CHAIRMAN: I feel greateful to our law for protecting me against that disease. That bull was a winner at the State Fair and at the International, and subsequently was sold in interstate traffic. Now, I am not a veterinarian, but there were about a dozen men here who held up their hands to-night to say that they had eradicated tuberculosis from their herds by following our State plan. If I had a herd of cattle that never showed any signs of disease or anything, I would not worry about it, but if any of them commenced to die or to pine away, I would have them tested.

MR. STEVENSON: My criticism against the test is that the way the test is applied for interstate shipment of cattle, it puts the moral responsibility on the purchaser; but don't compel me to do it so as to put myself in a position where he can say I am a crook.

The CHAIRMAN: You are not compelled to test for interstate shipments.

MR. STEVENSON: We have to do it if we want to sell.

The CHAIRMAN: You can sell with Holsteins.

MR. STEVENSON: I have got some Holsteins and got some good ones too, just made a world record the other day; why not modify our interstate shipment laws so that the purchaser out of the State may elect whether he will have the test administered.

A Member: He can do that.

MR. STEVENSON: No, it is put on me before you can get it out of the State. They say it will make Pennsylvania a dumping ground.

DR. CONARD: I would like to say a word or two giving a little experience I have had in testing some cattle. I am not in practice, but I do do a little testing occasionally and have done for a good many years, and it has been suggested whether or not a herd could be rendered free from tuberculosis with the tuberculin test; and Mr. Fielding just struck the keynote a while ago when he said that the responsibility was largely with the owner of the herd, that he did not do his part between times. I am going to cite two or three cases. One case was a bunch of high grade and some pure bred Guernseys, and they were tested perhaps three times; I am not right sure of the number of times but they were entirely free from tuberculosis in May; the last test was made in May. There were three cows tested into that herd and two or three tested out, that I tested myself, and they were tested as right as I know how, and the following May there was 30 cattle in the herd, the following May there was just 15 of those cattle reacted to the test. They were all fat and in good condition and looked fine. I was a little discouraged. We could not, for a little while, find out where the trouble came from. When we came to look around carefully, there was two farms adjoining us up the stream a little ways, a stream that forked and each fork went into a pasture on a badly infected farm; they centered in a deep, narrow ditch that the sun could not get into very well and came down into the field and that herd pastured there. Every animal reacted the last time. The disease had advanced just about the same; there was no more of the disease, there was no spreader there, just a little bit in each one. We did not pursue the test any longer, because the owner went out of business. But the point I want to make in this case was that the reason that that herd was re-infected was found out to be an exposure to other cattle that they could not avoid.

Now another case, a pure grade Guernsey herd that I had tested for as much as eight or nine years, maybe ten years, right straight ahead, tested every year and we had never found a reacting cow in that herd, they are hardy and sound; I am not sure but what the owner might be in here to-night, I don't know; he is in the Legislature at the present time and maybe in the room now; but they are sound and hardy and on two occasions he brought cows into the herd, was keeping them under quarantine until the test was made, and I

rejected both of those cattle on two different occasions. They were kept in entirely separate buildings. They were rejected and the herd protected from the invasion of tuberculosis by those cows. Another man had a herd of Holstein cows and we tested them three or four times and then had them perfectly free. We tested them two times after that with no reactor whatever, and then he thought he was perfectly safe. He went to a neighboring county and bought a few cows without the test, said he guessed he was all right. These cows looked well enough and he put them in without the test and in the following spring, in less than a year from the time he put those nine cows in that herd, the nine cows he has brought from the other county, I took out 33% of his herd, took out 17 and took out 7 of the 9 that he brought in. Now there was the responsibility on that man of bringing those cows in from another herd, so we lacked the co-operation. Another man close by him who had a very good grade herd indeed, having lots of trouble on account of cows losing their calves, decided finally to have them tested for tuberculosis and tested them twice, two successive years. The first time he took out, I can't remember the number exactly, but I will say about a third of them, I think he took out less than a third. The following year we took out three and we have tested them twice since without any reactions whatever, and those cows have quit losing their calves and are stronger, better and healthier cows than they ever were before.

I just want to mention that to show you that it is positively true that you can eradicate tuberculosis from a herd if you have the co-operation of the owner and do your work right.

A Member: Why not take a fool's advice? When I buy my cattle, I buy them with the understanding that they must be tested by the very best veterinarian I can find, and I dispose of the cattle before the limitations of the six months run out. I am complying with the law and have never sold a reactor yet.

The CHAIRMAN: What was the rest of it?

A Member: That's enough.

The CHAIRMAN: Does anybody else want to talk a while at Dr. Gill and Dr. Marshall?

A Member: In defence of the tuberculin test I wish to say that after that severe test we had of our 68, there was money appropriated and I went out and bought something like 65 head at private sales throughout the neighborhood. I tried to use good judgment and out of about 65 head I bought as soon as I got home I isolated them in another part of the barn and had Dr. Marshall to send his men there and have them tested under my supervision. We started in about 9 and did not go to bed, kept right on the job for 26 or 28 hours and out of that 65 head that I had bought around in the county we lost 7. Those cattle were slaughtered right away, all passed for beef. Since that time the remaining cattle have been tested three times and not a reactor found. Doesn't that speak well for the tuberculin test if made under proper conditions?

The CHAIRMAN: I think we are all agreed on these points, that the law we have in Pennsylvania is a good law; it is voluntary. And we will agree on this other point; it is slowly but surely reducing the number of tubercular cattle in Pennsylvania, because the people want to get rid of them. I think we can agree on that; in fact statistics show it is reducing them; even in the suspicious herds tested to-day the number of reactors is only about half what it was in 1895; isn't that right?

DR. MARSHALL: Less than half.

MR. STEVENSON: How about those that have never been tested?

The CHAIRMAN: How are we going to find out? What do you know about them more than I do?

MR. STEVENSON: I know just a little more than you do, because I get closer to the dairymen than you do and once in a while I milk a cow and you never do.

The CHAIRMAN: Yes I do; I have got, I expect, as many cattle as you have got but they are a different kind.

MR. STEVENSON: They don't give as much milk as mine.

The CHAIRMAN: No, and I don't want them to, if they did, I'd sell them. If I had to milk a cow, I would not have her, I mean if I had to milk her all the year around. I milked one cow last year and had a hard time.

MR. STEVENSON: I'll be honest and confess that that's all I have milked.

The CHAIRMAN: You don't know anything about these cattle that have not been tested, and neither do I, but we do know about the ones that have been tested.

MR. STEVENSON: When the Pennsylvania Livestock Sanitary Board only claims that the test has only been administered to three and a half per cent. of the cows in the State, you have got to admit that tuberculosis has not been materially diminished.

The CHAIRMAN: That three and a half is a pretty big percentage of the suspicious herds in the State because when a man commences to lose cattle, he comes in and has them tested. It is just like the fellow that thought foot and mouth disease did not amount to anything, but when he hauled out 18 carcasses, he concluded that it did. We have a sane law and it is sanely administered and it is voluntary and I think our veterinarians instead of having so many hard words flung at them, we ought to give them a little compliment. I want to tell you, gentlemen, that I was out in Ohio last week, and I am a friend of veterinarians, you know, good ones, and I never saw a crowd of fellows so grateful for a few friends as the veterinarians are now; they have been criticised up one side of the State and down the other on account of quarantines, and when they see a man with nerve enough to stand up for them, they are mighty grateful for it and I think they ought to be.

I don't want to cut you off, but it is getting late. Our meetings to-morrow are as follows: In this hall the State Board of Agriculture will meet; in the hall below, the Dairy Union and the Breeders' Association in joint session, and at ten o'clock there will be a meeting of the Committee on Amalgamation for these two associations. Here is a message from Thomas J. Edge, formerly Secretary of this Board, requesting that his greetings be extended to all his old friends, and inviting them to call on him, stating that he will be glad to see them at his home, 707 North Sixth street. Now, unless there are some other important matters before the convention—does anybody know of anything else?

SECRETARY CRITCHFIELD: I want to say for the State Board of Agriculture, the announcement has been made that we convene in this room to-morrow morning. It will be at 9 o'clock; that is just sixty minutes after 8 o'clock in the morning. We have a very interesting program for to-morrow forenoon; perhaps it will not create as much enthusiasm nor will we have as much amusement as we have had here to-night; but we will be glad to see any of you even though you are not members of the State Board, at that meeting.

The CHAIRMAN: I want to say right here that I am proud of our State Livestock Sanitary Board in Pennsylvania. For standing up for them and for standing up for the eradication of this foot and mouth disease, I have been getting a brick bat in about every mail lately, but I have got enough sand to stand up for these fellows. Pennsylvania has put more disease under ground in a shorter time than any other state in the United States. And, furthermore, underground is exactly where the disease belongs. We ought to be proud that our State Livestock Sanitary Board has put it where it belongs and not monkeyed around like they have done in some other places; and am proud of the fact the farmers of Pennsylvania, with few exceptions, perhaps only a single exception, have co-operated with our State Sanitary Board in getting rid of it. We have had co-operation in this State, and when you go to another state they say, 640 herds have been put away where they belong, look at what Pennsylvania has done. It is time we were getting proud of this State.

MR. STEVENSON: Aren't you a little premature in your judgment as to whether or not it is the best method?

The CHAIRMAN: No, sir.

MR. STEVENSON: What have you to say for the Guernsey importation in 1883?

The CHAIRMAN: I don't know anything about it and don't care anything about it. I will be pleased to have a good little scrap with you on this subject when we bring it up on the regular program.

A Member: I move that we extend a vote of thanks to both Mr. Gill and George W. Stevenson for the very interesting talks they gave us on both sides of this question to-night.

The CHAIRMAN: I think this gentleman over here ought to have our thanks too.

A Member: I will include him in my motion.

The motion was seconded and adopted.

The CHAIRMAN: Dr. Gill, Mr. Stevenson and Mr. Bowman will hereby consider themselves thanked. The foot-and-mouth disease discussion will be led by Dr. Marshall at some future session and I hope I will be here to see it, to hear it, and I hope to see it too, because I hope we will have a few little demonstrations like we have had to-night. It will be Thursday afternoon and I hope you can come here and have another warm time.

The meeting then adjourned.

WEDNESDAY MORNING, JANUARY 27, 1915.

The State Board of Agriculture was called to order at 9 A. M.; Vice-President J. H. Wilson in the Chair.

The CHAIRMAN: The House will come to order and everybody will please come forward.

The SECRETARY: Before we proceed with the program, I would like to have the roll called, for the reason that there were a number of persons who came in, I know, after the roll call yesterday, and we want to have a complete record of all who are here, lest we should fail to send vouchers to somebody, and that you would not like. Luzerne is not credited with a member on the roll here.

ASST. SECRETARY WELD: Mr. Kahler proposes the following names from the Hughesville Agricultural Society as delegates to this meeting: Kahler, Bock, Towns, Membold, Clark and Reeder.

The SECRETARY: I move that these gentlemen be received as advisory members and be allowed the privileges of the floor.

The motion was seconded and adopted.

The CHAIRMAN: First on the program this morning is the Report of the Microscopist and Hygienist, by Prof. J. W. Kellogg, of Harrisburg, Pa.

The SECRETARY: By a vote taken yesterday, the election of officers is made the order of the day for this hour, so the next thing in order will be the election of officers.

The CHAIRMAN: Next in order is the election of officers.

The following gentlemen were nominated as Vice-Presidents: Mr. Kerrick, of Bradford County; Mr. Young, of Columbia County; Mr. De Witt, of Tioga County.

The SECRETARY: In order to expedite the business, I move that the nominations close and that the Assistant Secretary be instructed to cast the ballot of the Board for the gentlemen who have been nominated.

The motion was seconded and adopted and the ballot was cast in accordance therewith.

The CHAIRMAN: The ballot being cast for those gentlemen, they are duly elected Vice-Presidents. Next will be the election of the Executive Committee.

The following members were nominated as members of the Executive Committee: S. S. Blyholder, P. S. Fenstermacher, M. M. Naginey, G. F. Barnes, H. G. McGowan, A. J. Kahler, C. M. Bower, Matthew Rodgers, John Schoener.

The SECRETARY: In order to expedite business, I move that the nominations close and that the Assistant Secretary be instructed to cast the ballot of the Board for the gentlemen nominated.

The motion was seconded and adopted and the ballot cast in accordance therewith.

The CHAIRMAN: The ballot having been cast for these gentlemen, I declare them duly elected members of the Executive Committee.

MR. BLYHOLDER: I want to call the Committee in session at once in the room in the rear.

The CHAIRMAN: The gentlemen named will please go with the Chairman of the Executive Committee.

The SECRETARY: Mr. Kellogg is the first whose name appears on the program this morning, and I want to say for him that he is very busy just now and will appear at some time during our session with his report, or if he does not appear, will hand it to me for publication with the proceedings of the meeting.

The following report was submitted:

REPORT OF MICROSCOPIST AND HYGIENIST

By PROF. JAMES W. KELLOGG

A report by your Microscopist and Hygienist to this body which would impart information on subject suggested by the title given your Specialist is called for and should be presented at this meeting. Because of the fact that other specialists of the Board are to speak on sanitation and allied subjects, and also because it has been impossible to devote special study to hygienic questions, it seems proper that a report should be made to you, gentlemen, covering the work

of enforcing the new Seed Law in which we have been engaged during the past year. Because of the newness of this work, it is felt that a report showing what has been accomplished thus far would be of special interest, rather than to devote time to a subject which can be commented upon by others.

Pennsylvania's first Pure Seed Law was placed on the statute books as a result of the agitation on the part of members of the State Board of Agriculture, seed growers and officials of the Department of Agriculture, to improve the quality of seeds being sold and grown throughout the State. At the 1913 session of the Legislature, a bill was presented by Representative J. H. Wilson, which was passed and approved by the Governor, April 29, 1913, which became effective as a law, January 1, of the following year. The Secretary of Agriculture was charged with the enforcement of the law and the laboratory of the Department was accordingly called upon to perform the necessary duties under its provisions. Proper equipment was installed in the laboratory and the service of a competent expert employed to make tests for purity on the samples which were collected by special agents or which were sent in by residents of the State.

The Seed Law establishes standards of purity for 21 kinds of seeds and prohibits the presence in the same of dodder and Canada thistle in excess of one seed in 3,000. It imposes a penalty for selling any of the seeds stated in the law, which do not meet the standards of purity, provides for the collection and examination of samples and for the testing of special samples of seeds sent to the Department, making a charge for such tests of 25 cents each. These standards of purity range from 75% to 97% as follows:

Medium red clover,	Trifolium pratense,	97%
Mammoth red clover,	Trifolium pratense,	97%
Crimson clover,	Trifolium incarnatum,	97%
Alfalfa,	Medicago sativa,	97%
Timothy grass,	Phleum pratense,	97%
Barley,	Hordeum vulgare,	97%
Spelt,	Triticum aestivum Spelta,	97%
Wheat,	Triticum aestivum,	97%
Buckwheat,	Fagopyrum Fagopyrum,	97%
Oats,	Avena sativa,	97%
Rye,	Secale cereale,	97%
Alsike clover,	Trifolium hybridum,	95%
Perennial rye grass,	Lolium perenne,	95%
German millet,	Chaetochloa italica,	95%
Hungarian millet,	Chaetochloa italica,	95%
White clover,	Trifolium repens,	90%
Red Top grass, (solid or hulled).	Agrostis alba,	85%
Canadian blue grass,	Poa compressa,	75%
Orchard grass,	Dactylis glomerata,	75%
Kentucky blue grass,	Poa pratensis,	75%
Red Top (unhulled),	Agrostis alba,	75%

Dodder and Canada thistle are prohibited from being present in excess of 1 seed in 3,000.

In testing seeds for purity, a careful selection of samples is of the most importance in obtaining results which will correctly represent the quality of the stock of the seeds or of the shipment being examined. Your attention is, therefore, called to this matter in order that if any of the members of the Board desire to have seeds tested or to direct others in getting this information, special care can be taken in securing special samples. If the seed is in sacks, bags or other large containers, samples should be taken from several different places, thoroughly mixed and the following directions carefully followed:

AMOUNT OF SAMPLE: 2 to 4 ounces, carefully secured and representative of whole lot.

ENVELOPES: Should be used and carefully sealed.

ADDRESS: Bureau of Chemistry, Pennsylvania Department of Agriculture, Box R, Harrisburg, Pa. The name of seed and address of sender should be also included.

CHARGE FOR PURITY TEST: 25 cents is the fee charged and it should be submitted with sample in the form of a certified check, money order or cash. If cash is sent for one or two samples, it may be inserted in the sample of seed with safety, if the envelope is carefully sealed.

After the seed tests have been completed, reports are sent to the senders stating the name or kind of seed received, the percentage of pure seeds, foreign seeds and inert matter, the presence of freedom of dodder or Canada thistle, together with a receipt for the fee charged. The following explanation of what is meant by pure seed, foreign seed and inert matter will be of assistance in judging from the reports received the character of the samples examined:

PURE SEED: Consists of the seeds under examination only. If for example, red clover is being tested for purity, the percentage of "pure seed" represents the amount of red clover seed present by weight in a given quantity.

FOREIGN SEED: Includes the amount of all other seeds present which differ from the kind of seed under examination.

INERT MATTER: Includes all materials other than pure and foreign seeds, such as less than half parts of seeds, broken stems, dirt or any other foreign material.

During the year just closed 202 official samples of seeds were collected by special agents of the Department from dealers and seedsmen located in the State. These samples were all tested as required by the law and reports sent out to the parties from whom the samples were obtained. In addition to this there were 376 special samples sent to the Department for purity test by seed dealers and seed growers located in the State; thus taking advantage of the provision in the law for finding out whether seeds which were to be offered for sale would meet the established standards for purity.

The results of the seed tests made during the past year have been published in the form of a Bulletin, No. 258, which will be sent

to any one desiring a copy, if they will kindly send their names to the office of the Bureau of Chemistry. This report shows the tests made on each sample of seed examined and goes into detail concerning the work. It will be unnecessary at this time to attempt to give this information. It will be of interest, however, to include in this report, a summary or an average of the purity of the official samples of seeds examined, as follows:

AVERAGE PURITY OF OFFICIAL SAMPLES

Name of Seed	Number of samples	Standard of purity	Pure seed	Foreign seed.	Inert matter
		Per ct.	Per ct.	Per ct.	Per ct.
Red clover,	73	97	98.9	0.7	0.4
Crimson clover,	7	97	98.5	0.5	1.0
Alfalfa,	20	97	99.6	0.1	0.3
Timothy grass,	33	97	99.1	0.5	0.4
Barley,	2	97	98.3	1.5	0.2
Buckwheat,	3	97	99.3	0.2	0.5
Oats,	4	97	98.8	0.3	0.9
Alsike clover,	30	95	96.5	2.8	0.7
Perennial rye grass,	3	95	95.9	2.2	1.9
German millet,	6	95	98.1	1.3	0.6
Hungarian millet,	3	95	97.5	1.7	0.8
White clover,	9	90	94.9	4.0	1.1
Red Top grass (hulled),	2	85	89.9	0.4	9.7
Orchard grass,	6	75	78.3	1.5	20.2
Kentucky blue grass,	1	75	82.3	0.5	17.2
Total,	202	.....	.....	.....	.....

It will be seen from the above figures that in every case the average test for each kind of seed was in excess of the standards of purity, and in only a few cases the actual test ran slightly under the required percentage.

It, no doubt, will be of interest also to learn something of the methods employed in testing seeds for purity. This work is rather tedious and takes considerable time and care, if accurate results are to be obtained. The methods which we use are essentially the same as thost employed in the Seed Laboratory of the United States Department of Agriculture and other well equipped laboratories. Because of the lack of complete information on the subject, no standards for germination were included in the Seed Law and, therefore, germination tests are not made by the Department.

After the samples of seeds have been received in the laboratory, they are given a number and separately examined. The official samples collected by special agents are received in special seed envelopes and those samples which are sent in by dealers or seedsmen located in the State are placed in envelopes for this purpose and properly labeled and numbered. Each sample is thoroughly mixed and sub-

divided until the amount necessary for a test is obtained. A mixture of seeds cannot be uniformly mixed in the same manner as can material resembling flour, meal or mixed feeds, for the reason that heavier and smaller seeds have a tendency to separate from the lighter and larger ones, and, therefore, the portion of the sample to be tested must be secured in a manner to overcome this tendency of the seeds to become segregated and improperly mixed. A mixing and dividing apparatus is, therefore, used to obtain the proper results. It consists of a revolving funnel shaped hopper into which the whole sample is placed and by means of a set screw and disc to regulate the delivery of the seed, by revolving the hopper with the rotating crank, the sample is thoroughly and accurately mixed and delivered equally divided through V shaped delivery tubes into two receptacles. In this manner the sample is sub-divided until the required amount is secured which varies with the size and weight of the seeds under examination from 1 to 30 grams. This amount is carefully weighed on an analytical balance, all weights being recorded to the fourth decimal part of a gram.

The weighed portion of the sample is then separated into pure seed, foreign seed and inert matter by the aid of the eye or lenses and occasionally assisted by means of various sized sieves, as the case demands. In the case of small seeds where light chaffy material is present, and especially in the case of grasses, which contain chaff, pieces of stems, leaves and other foreign material, a preliminary separation is made which is effected by means of an electric blower. This apparatus consists of a long glass tube, one end being bent at right angles, the other end being covered by a fine meshed cloth, an air blast and a receiving jar. The weighed portion of the sample is placed in the glass tube resting on the cloth in one end, this end being inserted in the blast pipe and the other in the receiving jar.

The air blast is turned on the light chaffy and inert material is blown over into the receiving jar, the heavier portion of the sample remaining in the tube. The final separation is made by placing the divided portion thus obtained on a white paper-covered table, especially made for this purpose, and by means of the eye and lenses separated into pure seed, foreign seed and inert matter as in the case of samples which do not require the preliminary air blast separation. These portions are weighed and the percentage of each estimated.

If the presence of dodder or Canada thistle is noted or suspected, the complete sample is examined and the proportionate number of these seeds to the whole number of seeds is estimated.

If at any time any of the members of the Board desire information along this line of work, or any other work which is being done in the laboratory of the Department of Agriculture, we will be only too glad to give all the information which we possibly can. Our laboratory is always open for any of you gentlemen, and we shall be pleased to have you call and inspect the work of testing seeds for purity.

The CHAIRMAN: Next on the program is the report of the Entomologist, Prof. H. A. Surface, of Harrisburg, Pa.

The report is as follows:

REPORT OF ENTOMOLOGIST

By PROF. H. A. SURFACE.

The year 1914 was marked by many peculiar entomological conditions worthy of record in the State of Pennsylvania. In the beginning of the year, if we had investigated all of the granaries and mills in the southeastern part of the State, we would have found a serious and extensive infestation of stored grains by the little pest known as the Angoumois grain moth, which, however, is one of the five or six different species of insects commonly, but wrongly, called the "weevil." Great loss has been experienced from this pest during the past year, and in fact more than ever before, chiefly because it is gradually reaching into new regions, and farmers at first do not recognize it as a very destructive pest, and, therefore, do not give it the attention that is necessary for its control. Tens of thousands of dollars worth of property have been destroyed by it. For example, we know a prominent farmer in Lancaster county at the present time selling his wheat for sixty cents per bushel to feed to chickens, because it is so badly infested with the larvae of the Angoumois grain moth; when were it not for this pest, he would receive about two and one half times that price. The means of prevention is to thresh the crop early, to get it out of the straw as soon as possible; and the remedy is to fumigate with carbon bisulphide by pouring this liquid over the grain in a closed bin, at the rate of one pound for each one hundred cubic feet of space occupied.

Early in the season came reports of canker worms defoliating the forest and fruit trees in the northern, central and western parts of the State. The wingless female ascends the tree from her winter abiding place, in a cocoon in the soil, and lays her eggs in irregular bands around the twigs, or in patches on the bark. She can be kept down by proper banding or by painting the trees with Tangle Foot preparation; but this must be done early before the frost is all out of the ground. The very young canker worms are easily destroyed by spraying with standard arsenate of lead formulae.

White grubs or "grub worms" (Lachnosterna larvae) were exceedingly abundant and destructive both early and late in the season. They became so destructive to lawns late in the fall as to destroy the grass entirely, causing it to burn brown, and cutting off the roots so that it could be rolled back like the sheared fleece of a sheep. There is an effective means of preventing damages by this pest, where ground can be cultivated, and that is to plow the ground in the fall, and run across it two or three times with a disk harrow set to cut deeply but not to scrape nor turn too much; or stir it deeply with a spring-toothed harrow. Cultivate it thus as late as possible in the fall and as early as possible in the spring, and postpone the planting until late. On a farm one of the best means of getting rid of the white grub is to turn the hogs into a sod field where the pests are found. Remove the rings from their noses and let them

root. Some persons will be surprised to see what an amount of soil they will turn up in a short time, and likewise what an immense number of white grubs will be destroyed by them. There is just one important point to bear in mind in this regard, and that is that a very seriously injurious spiny-headed intestinal worm has its alternating stage in the white grub as one of its hosts, and in the hog has another of its hosts. In other words, when hogs eat white grubs they are liable to become infested with seriously injurious internal parasitic worms. This only happens when the same ground is used for hog pasture each year or every other year. It is easy to avoid it by making sure that there is an interval of at least two years between the pasturing of hogs on the same ground. We are at present performing experiments for the extermination of this pest by the use of gases and poisons in lawns.

Cut worms were very bad early in the season, and took their toll from the crops of orchards and fields. They, too, can be prevented by late fall plowing and subsequent deep cultivation. The cut worm has a life cycle of but on year, while that of the white grub endures for three years. Cut worms are easily killed by poison bran mash. Fifty pounds of bran and ten pounds of shorts can be mixed with one-half pound of Paris green or dry arsenate of lead, and enough old strong molasses added to give it an odor, with enough water to dampen it slightly and make it cohere. Someone has suggested the addition of two or three grated lemons to give an odor to attract the pests, and experiments have proven this addition to be successful, although we know where some of our German farmer friends in Lancaster county successfully treated entire corn fields for cut worms without the addition of grated lemons or oranges. This poison mash should be scattered over the ground just as thinly as possible. Ten pounds will prove to be enough to kill the cut worms on an acre if spread thin, but there is no objection to the use of more. A very important point is that if scattered quite thin over the ground and broken up into small masses, it will not kill domesticated fowls or birds, even if they should eat it, as there will not be enough poison in a small quantity such as they might take, to affect them. Two Lancaster county farmers who followed our directions in doing this, reported that they cleaned their corn fields of cut worms, while others replanted the second or even the third time. By a small pinch of this at the foot of each young tree the climbing cut worms can be killed, and by scattering it where young plants, such as cabbage plants, are set the cut worms are destroyed. We have killed as high as nine cut worms around one cabbage plant in one night, finding them dead in the morning.

The most serious and conspicuous outbreak of pests on lawns of this State was by the Army worm (*Lucania unipuncta*). This is a species of cut worm which is present every year, but does not always increase to such numbers as to "march" or move from one feeding place to another, and then receive the common name of "Army worm." Its damage was terrific to the lawns and gardens in nearly all parts of Pennsylvania, eating away the grass in a single night, until what was a beautiful lawn during the previous evening was but a brown bare patch of ground the next morning. The inspectors of the Bureau of Zoology were early on the job, and showed how to

control this pest by spraying with arsenate of lead or Paris green, according to the standard formula. It was readily proven that it was not necessary to go to the trouble of digging ditches and pitfalls, or other contrivances, to destroy the army worm. Spraying was satisfactory in results for those who watched and did it in time.

The most remarkable piece of practical work in economic entomology during the year, was the successful artificial introduction of the enemies of the San Jose scale, now commonly known as the scale parasites, into scale-infested orchards in certain parts of Pennsylvania, as well as in other states. The natural way of suppressing all pests is by their parasites, and the Economic Zoologist succeeded in finding the parasites in great numbers and in rearing and disseminating them, so that they were effective in destroying the scale in orchards to which they were thus introduced. As a result, trees which previously bore fruit entirely unfit to be seen or used, produced this past season as fine fruit as was ever grown anywhere. There are specific cases where such fruit was borne on trees that had previously been infested with San Jose scale, but never had been sprayed for this pest, and which were cleaned up entirely and solely by the parasites.

An account of this successful introduction of parasites was presented recently by the writer to the American Association of Economic Entomologists, meeting with the American Association for the Advancement of Science, at Philadelphia, and from the scores of professional entomologists assembled, there was no dissenting nor criticizing word.

The following is an example of many reports that have been received, stating the results of this beneficial distribution of scale parasites: Within the past few days different states and countries, even as far away as Australia, have made requests for shipments of parasites in the hope of suppressing the San Jose scale in their orchards as effectively as they have done in those of Pennsylvania. When this subject was first mentioned a few years ago, it was thought to be a hoax, but it now proves the cause of the disappearance of the San Jose scale over vast areas, embracing several counties in Pennsylvania. But to the brief time of but fifteen minutes allotted to us for this report, mention of certain other important pests can not here be made, but we should not close without reference to the pests of the household and livestock.

It appears that the roach bug or Croton bug frequently occurs in houses and is quite annoying. A Franklin county correspondent wrote to us that he was having indescribable trouble with this pest. I recommend dusting fresh powdered borax in abundance around the floors and cracks, and especially pumps and sinks, in the pantry, on shelves, etc. He tried this, and within a few days replied that the effect was as if magical. He could see many dead roach bugs, but no live ones were left.

Pigs often remain thin and stunted, the hair becomes long, and ears droop, the animals loose appetite, are inactive, and spend much of the time rubbing themselves, and finally may get the "thumps" and die. A careful examination would reveal great numbers of hog lice on them, which could have been killed by the application of

equal parts of kerosene and grease, such as old lard. Insect pests and mites in poultry houses have been destroyed by spraying thoroughly with the boiled lime-sulfur solution. More and more this material is coming to be recognized as the greatest insecticide and fungicide, as well as germicide, that has ever come to mankind. It is to the credit of the State of Pennsylvania that we faithfully stood by our convictions in the early recommendations of this material, until now, without exception, every state in the Union, and every civilized country on the face of the earth has come to recognize it and recommend it as the best material to use for destroying pests, whether they be insects or diseases of trees, or the insect pests and disease germs of poultry or livestock, where they can be met by spraying or washing the surroundings with any solution.

The CHAIRMAN: This report is now open for discussion.

A Member: Is not that carbon bi-sulfide dangerous to use in case of light?

PROF. SURFACE: Keep fire away from it. It is the same as benzine or gasoline; the fumes are explosive if fire is brought in contact with it, but it is no more dangerous than benzine or gasoline. We use one pound for each 100 cubic feet in the granary. The fumes of cyanide of potassium will kill a person if he fills his lungs with it, but this carbon bi-sulfide mixture will not. It is nauseating and if breathed for a few minutes will cause headache, and if breathed continuously will cause death. The right name is bi-sulfide of carbon or carbon bi-sulfide; one pound for each 100 cubic feet of space. You pour it over the grain.

MR. KILLAM: Has there been any indication of that parasite that destroys the San Jose scale becoming mischievous?

PROF. SURFACE: No sir, it is known to feed on the eggs of the tent caterpillar and San Jose scale.

MR. KILLAM: Where is it supplied?

PROF. SURFACE: At the present time in Lycoming county and around Jersey Shore it is abundant. A year ago it was abundant near Mifflin. I get one of my inspectors working in that district to send me a lot of cuttings from trees, put a potato at each end of one of these cuttings and wrap it in oil paper and mail it to the person who wants to introduce it. He ties that cutting to the limb of his tree; the parasite are deposited in the larvae state under the waxy scale. They will feed as soon as it gets warm enough, feed on the tissue of the body of that scale. The insect, as soon as grown, is transformed into a minute, wasp-like insect that would take about six of them to be as large as a period in newspaper print. They bore through the scale and lay their eggs in other scale, producing several generations a month, faster than the scale, and that is why they kill the scale.

MR. KILLAM: They follow the scale up and exteriminate it?

PROF. SURFACE: Yes sir,

MR. KILLAM: I never was a believer in that method until recently.

PROF. SURFACE: I admit that most of us regarded it as experimental until recently, yet I don't wish to give the impression that I desire to recommend any man to abandon the spray pump. A man in Michigan asked me for the parasite. I sent them to him, he put them in his orchard and a few months afterwards sent me cuttings from the trees and said, "I want to know whether the parasites are here?" I saw the holes and knew they were there. A year afterwards he wrote me and said, "I do not wish to risk leaving the orchard unsprayed, so I took a number of cutting from my apple trees and fastened them to the willow trees where the scale was bad. The parasites cleaned up the scale on the willow trees and then spread back to the orchard and cleaned up the scale in the orchard."

MR. KILLAM: Would the spraying hurt the parasite?

PROF. SURFACE: I don't believe it would, but the parasite is so well protected under the scale that it does not kill as much parasite as it does scale.

A Member: Will the army worms be as bad next season as this?

PROF. SURFACE: I don't think so, because they were parasited last year and the parasites are working in them.

A Member: They destroy our oats through Erie county. How do you spray that? Do you take a wheel spray like you use on potatoes, and drive through your fields?

PROF. SURFACE: Use a cart sprayer or a knap-sack sprayer. If you have one, I would recommend the field crop sprayer; I wouldn't be without that nor without the little knap-sack sprayer to carry over the shoulder. I have specimens of the male and female gypsy moth, and I call your attention to that. We don't know of it in Pennsylvania, but you people who are living among the trees and plants and have a chance to watch for this pest should do so. The white colored one is the female, the brown is the male and the long brown one is the larvae of the gypsy moth, for the extermination of which hundred of dollars have been spent almost in vain in New England.

A Member: Woulldn't it be a good thing for Pennsylvania to sell these parasites?

PROF. SURFACE: I have many persons asking me to send them $25, $50 and $75 worth of parasites. I send the specimens and let them go along with the experiment. I do not mean that I can send 100 of them to 100 of you gentlemen and that 100 would succeed; probably only 10 would succeed, but the point is proved in some cases.

MR. JOEL A. HERR: To what extent does the scale parasite prevail in Clinton county?

PROF. SURFACE: It is very abundant in Clinton county. You will notice it not so much by seeing the parasite as by seeing the

absence of the scale. You yourself will see in the next two years a conspicuous disappearance of the San Jose scale in your county; I might well say within the next year. I know it is abundant there at the present time. The parasite has not reached Bradford county yet, but it has absolutely cleaned up the scale in Williamsport. It is in Union county now; it has worked over the lower part of Union county and is working in the upper part. At the present time there is more parasite in Union, Lycoming and Clinton counties than any other three counties I know of. We introduced it into Blair and Cambria counties by artificial means. There are some places where it has started, where the farm advisor has co-operated with me in introducing it into that region and he reports its successful introduction, so it will spread more rapidly than if we had not started it. It is like a fire that is sure to spread throughout the entire city, but it will spread quicker if we take brands and scatter them.

MR. JOEL A. HERR: If a county is covered over with the San Jose scale and the parasite destroys it, will it come there later?

PROF. SURFACE: In future years it may; the trees will be liable to get the scale on it again, after having been cleaned. We must not infer that the parasite will keep the orchard clean eight or ten years from now, but it will become active after the scale becomes abundant. It is nothing but the natural law of the increase of the host and the parasite; every host and parasite is working on the same principle.

MR. J. ALDUS HERR: In reference to the moth that attacks the wheat after it is harvested—in our county of Lancaster we have been exceptionally annoyed after the wheat is in the stack and previous to threshing. For instance, in my own case, where the wheat had gone through a sweat but would never cool off when we threshed it, the wheat was a little warm, not a great deal, but you could, by putting your hand in, feel that the temperature was not normal. We threshed it and put it in a bin and had it treated with carbon bi-sulfide and it was not effective and we could save it only by stirring it every day, and I kept my wheat for probably—well, some time the latter part of December and was compelled to sell it or lose it. Some of my neighbors who were smarter than myself, expecting a higher rise in the market, held their wheat and the result is that one of my neighbors has lost about 600 bushels of wheat—it has musted for him.

A Member: I would like to inquire what the ventilation was?

MR. J. ALDUS HERR: The ventilation was all right; put six or seven bushels in a bin where you ordinarily keep it, but I know instances where animal heat generated by the insect in the berry would make it warm and spoil it. There is plenty of wheat in Lancaster at the present time that is not fit for millers' purposes.

PROF. SURFACE: I want to say that there is nothing new whatever in what Mr. Herr reports. It is well known, I have several instances of that kind reported to me and that is exactly why I brought that bottle of insects in that wheat just as it is. I want every man to see those insects working on top of that wheat in the bottle; the

lower grains are comparatively free, even in so small a pile as that bottle represents. The Angoumois grain moth had laid her eggs on the wheat in the field and the eggs were there. It is not every dose of quinine that breaks up the malaria; every doctor that visits the patient does not cure the patient; there are conditions when carbon bi-sulfide will not do the work because of imperfect treatment, because of failure to cover the wheat and hold down the fumes, because of the use of an insufficient amount of material so that it does not kill the pest, and then too, it takes a second treatment to kill the eggs. You may kill all the larvae or worms in your wheat and the eggs are more hardy than the moth or worm and will not be destroyed by that treatment. Then, if you don't give it a second fumigation, say in a week, you can expect the pest to continue but it will work more abundantly in the upper than in the lower layers. I know of many more cases where farmers have saved their wheat by threshing it early and selling it, but if you want to hold it, you should fumigate it twice.

MR. J. ALDUS HERR: But you cannot get the machine, the mill gets full, down goes the price and you can't sell it; that is what we get up against.

PROF. SURFACE: There is no other method of controlling the Angoumois grain moth that has never been found sufficient. We must rely upon the truth as we know it. We do know that threshing early saves the crop in most cases, and we know positively that the longer the grain lies in the straw, the more infected it is, and with that we must live up to the light we have. There are a great many pests that neither the scientist nor anybody else can give you any method of treating satisfactorily, and I can name a lot for which there is no satisfactory treatment, but fortunately we do have one key to help us out on this Angoumois grain moth trouble. I have the grain covered with the wet blanket for two days; the fumes disappear in that time and there is no odor—no fumes there.

The CHAIRMAN: You have heard the report. Is there any further discussion? If not, what will be done with it?

It was moved and carried that the report be received and placed on file.

The CHAIRMAN: There were some new Vice Presidents elected this morning, and the first man named and elected was F. D. Kerrick. He will now take the Chair and I will surrender the gavel to him.

(Mr. Kerrick takes the Chair).

The CHAIRMAN: I want to thank you for the honor conferred; indeed I feel it is a high honor to preside over your deliberations. I am glad of the privilege of meeting with the members of the State Board of this great Commonwealth, and I am glad to extend the hearty hand of fellowship that prevails between us. Really I am proud of this organization, and I want to say to you, gentlemen, for my own county, during the last Institute last week, that I have never had as good attention and as large an attendance as we had last week and I desire to congratulate our Secretary of Agriculture and

his assistants on the efficient work they have accomplished. Our next report is that of the Ornithologist, Dr. Joseph Kalbfus, of Harrisburg.

Dr. Kalfus then presented the following report:

REPORT OF ORNITHOLOGIST

By DR. JOSEPH KALBFUS

Through some misunderstanding and entirely without my knowledge or consent, it appears I have been appointed to a position upon the State Board of Agriculture, that I am entirely unfitted to fill; and while I may know something about the habits of birds and the benefit of their life-work, I am not an ornithologist, and should not be placed in a position wherein I am expected to teach what I do not know. And I herewith most respectfully request that another be selected to fill this place. I surrender unconditionally.

In my journey through life, I have, to a limited extent, observed the actions of birds around me. In early life it was my privilege to cross the plains of Kansas, Colorado, Nebraska, and the territory north of these points, along the Rocky Mountains, and to there witness the lighting of untold myriads of grasshoppers on vegetation, to the absolute destruction of every growing thing. I have seen the army of birds, including many families and species, at work feeding on grasshoppers and know what the birds can do.

One of the great mistakes made by the majority of our people regarding birds is that they apparently do not understand that each family, and frequently each species of birds, has its special work to perform, and that while at times perhaps the majority of the feathered tribes may feed upon particular and abundant insects, the most of our birds have a special liking for some peculiar line of food, and confine themselves to this particular food as long as possible.

We have in Pennsylvania six kinds of common woodpeckers, each kind feeding in the place peculiar to its species. The flicker, one of the largest of this family, is the most terrestrial of the family and takes the most of its food upon the ground. The majority of the food taken by this bird during his stay with us is composed of ants. The ant is the greatest protector of plant lice or aphids, insects that are said to produce their young alive. The ant is said to carry these creatures, that are almost incapable of locomotion, below the frost line in the fall, to carry them out in the springtime, and to place them on growing things, where they can secure needed nourishment, the ant getting from the aphid an excretion known as honey dew. Just as the farmer keeps his herds, his cattle, his sheep, his pigs, for profit, so the ant keeps and cares for and defends its army of honey dew producers. Along comes the flicker and destroys the ant, with the result that the aphid having lost its protector, or caretaker, falls

a ready victim to some of its man enemies, or dies of starvation. No farmer can afford to have a flicker killed on his property.

Again, the cuckoo, one of our shy birds, one that builds its nest in thickets and moves about so quietly as to be but seldom seen by men, and the oriole, that builds its nest in the open, attaching its hanging house to the tip of the most delicate swaying branch of the elm, by the roadside, or near our homes, constantly in view and singing almost continuously during daylight hours, have the same food preferences. These two birds, of apparently widely diverging dispositions, are the only two birds in this State that make a specialty of destroying hairy caterpillars, of which the caterpillars of the brown-tailed moth are a striking example. They seem to have been intended by the great Creator to do a work for you that but few birds try to do, or could do, if they did try.

Audubon, writing of this disposition of these two birds long ago said, that an examination of the stomach of either the cuckoo or the oriole, during the summertime will show same to be lined with hair. And this was so; but the hair in the stomach of these birds was not a growth of the stomach, but, instead, was the hair of the caterpillar that had fastened itself in the lining of the stomach of the bird and remained there until dissolving by the juices of the stomach. You get a splinter into your flesh, and soon there is inflammation, followed by suppuration. Nature is trying to throw out the offensive substance and unless this is done, there may be serious trouble. One hair in the lining of the stomach or in the stomach of the great majority of birds would surely cause trouble, and many hairs, so affixed, would undoubtedly lead to serious trouble, perhaps death.

These two birds appear to have been created to do a special work for you, that other birds cannot do, and it is just so with all our birds; some on the ground, some on the trunks of trees, some in the branches, some feeding on insects found in one part of a tree, some on another kind of tree, some in the air, some in the water, but each family and species, no difference where found, having a specialty, and doing a work for you that no other bird tries to do. And just as the community in which you live is prosperous because of many men doing many things, so the bird world means much or little because of the presence in reasonable numbers of a variety of birds, rather than a large number of any species of bird, each one doing its own particular work.

When the farmer and his wife, his sons and his daughters, understand what the birds are doing for them and see to it that birds are accorded that protection they deserve around their premises; when houses are put up for the bluebird and the wren and the nuthatch, and such other birds as will live in houses; when birds are fed during the wintertime as they need to be and should be; then, indeed, will the dawn of a better day be at hand, and we can well say, figuratively speaking, "The winter is over and gone and the voice of the turtle is heard in the land."

As an illustration, read what Edward Howe Forbush, the leading Economic Ornithologist of New England, if not of the world, reports under date of August 10, 1914:

"I have been looking over the destructive work of the army worm in this State. While the worms have been quite destructive in Wareham, Massachusetts, they have done no harm at all on my farm. In fact, you would never know from the appearance of vegetation that there was a worm on the place. I have taken extra pains this year to attract the birds, and they have eaten a great many of worms. Thirty or forty rods away from my place, the worms are beginning to be destructive, and in other parts of the town they have done a good deal of harm. They have done no appreciable injury on other farms where I have put up nesting-boxes in quantities. In Martha's Vineyard, the army-worms have cut corn crops to the ground. It is rather significant that the worms have done the most harm where poisons have been used to check them. Where no poison has been used, and where the birds have been attracted, the worms (although very numerous) have not done very much harm. On the State reservation, where the Heath hen has been protected, and where a great many nesting-boxes were put up this year, birds were very plentiful, as the boxes were nearly all occupied, and they were feeding on the army worm in large numbers. Recently I saw here quite a number of Heath hens apparently feeding on the army worm. Where poisoned bran was used in trenches to kill the worms on a large estate formerly owned by Professor Shaler, very few birds were seen, and we had several reports that dead birds had been found along the trenches, but I got there about a week too late and did not see any personally. I hear that a good many blackbirds and robins have been poisoned and that quail have disappeared where the poison has been used."

Quail are among the few birds that destroy potato bugs, and for this reason alone their presence should be encouraged on every farm. In addition to this, they undoubtedly destroy untold numbers of other insects and vast quantities of weed seeds, and will surely make a full return to the farmer who may scatter feed for them during that time when the world is covered with ice and snow, when poor Bob-white and his family are suffering from hunger and about to die of starvation. A little grain placed where these poor dying birds can get it will mean more to them than the expressions of sympathy that could be extended to them by all the people of the county in which they are located. Put yourself in their place and think of what cold and hunger would mean to you. A piece of suet or tallow, or a shin-bone of a freshly killed beef, fastened to the trees around your home or in the orchard will surely be appreciated by the hairy and downy woodpeckers, commonly known as sapsuckers, whose specialty is the destruction of the codling moth, and the chickadees, and nuthatches, and other winter birds, that, through the destruction of harmful insects and their larvae, overlooked by the summer birds, will repay many times over any outlay of either time or money you may make in this direction. I know but little about the structure of birds, or how many feathers each species may have in its wing; but do know our wild birds are necessary to your happiness and success as farmers in Pennsylvania, and I beg of you to help the birds to help you.

Ornithologists, for reason of better understanding and study, divide the wild bird world into orders, families, genii, species, and sub-species, etc. One of the orders is known as "Raptores," and includes all predatory birds that wear feathers. The lifework of some these birds belonging to this order is considered to be beneficial while the lifework of other is decidedly injurious. When a Goshawk or a cooper's hawk or a sharp-shinned hawk even threaten to strike your poultry, you are out after him at once with a gun as you

have a right to do and should do. The fact that one of these birds lives in your neighborhood means possible death to many of your fowls and loss to you. The death of the birds means safety to the entire brood, and profit to you. And my idea is, that this unfixed, varying thing, covered by the word "profit," is what most farmers are trying to secure. City folk, of course, have no such countryfied ideas. They are above that; they are actuated by other motives. To my mind there are various birds described by ornithologists, and then some, and I am fully satisfied that many of our real predatory birds are entirely without feathers, and that many of them live and roost in cities, each one of which is to my mind far more injurious to the interests of the man who labors on the farm with his hands than all the order of birds wearing feathers that may come upon his property, and classed by ornithologists as "Raptores."

I shall not attempt to enter into a consideration of the numerous and varied happenings that lead me to this conclusion, and shall consider but one line of many that I know of, by way of illustration: The dairy interests of the Commonwealth, in the aggregate, amount to considerable and the cost of maintaining a dairy is no small charge upon the farmer. You own your cattle; you paid for the land upon which they graze; you paid for the lumber, etc., used in the construction of the buildings in which they are housed. You labor early and late to supply the food for the maintenance of your herds, you milk the cows, you do such other things as may be needed to keep your cattle in condition, and send that milk or its product to the markets, through the middleman. Milk lost through souring or from any other cause is your loss. It is estimated that it requires the product from at least three cows to keep one cow. It is also asserted that not more than one cow in three really makes a return of "profit" to its keepers. It is up to every farmer to save at every turn, to be able to make both ends meet. He skimps and twists, wears old clothes, goes to bed at dark so as to save the cost of oil, in some instances eats what he could not sell, and is forced to place his product that he may have for sale in the hands of the unclassified bird from the city, whose sole object is, as he tells you, to help the farmer.

This bird, and his fellow birds, form a company, and call it a Creamery Company. Your milk is tested at these places, and you are paid the minimum market price according to the presence of butter-fat as shown by the test applied at that place. I know of a man who has been collecting data regarding this matter for some time. Upon one occasion the milk from one cow, taken at the same milking and well mixed, was divided into two parts, each part as tested at this creamery, and showed a marked difference between the two tests. At another time the morning's milk, after being thoroughly mixed showed, as tested at the creamery, a certain mark. The evening's milk treated in the same way showed a certain mark, while portions taken from the same milkings and cans and sent to a Philadelphia chemist, one of the best testers of milk in this State, showed the morning's milk at the creamery, and the evening milk to have been seven-tenths above the creamery tests. The uniform test for the two milkings was eighth-tenth above that given at the creamery, the Philadelphia chemist saying in his report that the milk presented to him from this dairy was the most uniform presented for examination for some time.

Again, I myself took occasion to visit this creamery in question and saw men bring in a can, one-half or three-fourths full of milk, and take away full cans of skim milk, not counting the froth, for I saw these men dip off the froth with their hands, so that the can might contain more good solid skim milk. I know that many men who bring no milk at all to this creamery carry away buckets and cans of skim milk. In this interest I visited State College, and talked at other points in the State with various chemists in an effort to be absolutely right in this matter and from what I hear I am led to believe that sulphuric acid being exposed to the air for some time, deteriorates from one cause or another, and cannot bring the result desired or expected by the man who has milk to sell. One young gentleman, a student at State College, told me, in attempting to carry on his work during the college vacations, he had to visit six or seven drug stores in a certain county before he was able to secure "clean sulphuric acid" such as he knew he must have to get the correct re-action. When I asked him what he meant, he said, "Acid to bring the true re-action must be pure, and if pure will be as clear as water. Many of the preparations offered me were smoky, really opaque." Investigation along that line convince me that this idea is correct, that tests made through the use of acid not up to the standard is simply guess work, and a farce.

I know of several instances where milk that would have gone to this creamery became sour, and was churned by the farm people. The return secured in butter being considerably above the return that would have come had the butter-fat been separated at the creamery. I know about the claims made by creamery managers regarding the weight of water and salt, etc., in the butter, as compared with butter-fat alone, but "am from Missouri" and cannot see where any harm would come to creameries, or to farmers, if a sufficient number of men was added to the working force of the Dairy and Food Commission of Pennsylvania to enable them to have inspected in all ways the various creameries of this State. If a farmer happens to water his milk instead of his cow, he will most likely get into trouble, and I believe the producer of dairy products is just as much entitled to protection as is the consumer of such products. Again, I believe it would be well to compel every creamery in this Commonwealth to establish and maintain a system of mechanical devices through which the farmer would have returned to him every pint of skim milk belonging to him. This means "profit," it is his right, and is a question entirely outside of the price he may secure for his milk. It seems to me that the time has come when every milk producer in this Commonwealth should take down his gun and go after the unclassified predatory bird. I thank you.

The CHAIRMAN: Gentlemen, is there any discussion on this topic?

The SECRETARY: I do not want to discuss this question; but I want to say that the report that was just read by Dr. Kalbfus called to my mind the story of a colored man who went to hear Fred Douglass make one of his inimitable speeches, and after sitting there for an hour and listening, as everybody would who had the opportunity to hear Fred Douglass, he came out and said, "For the Lord's sake,

if that man can make a speech like that and he's only half black, what would he do if he was all nigger?" Mr. Kalbfus tells us he is not an ornithologist, and I thought, while he was reading, if he were an ornithologist, what might we not expect from his report? I am sorry I slipped into the room while the Executive Committee was in session and said to them, "Mr. Kalbfus wants to be excused." I hope they will catch what I am saying now, somehow, and ask him to continue right in the place in which he was put a year ago.

MR. DE WITT: I feel as if I could not let this question go by without saying something. for I feel that has been one of the best papers that has been read here, especially to the farmer who is engaged in the milk industry as they are in my county. He has given me thoughts. I have always had a dairy on my farm and we have been patronizing creameries and condensers, and he has thrown out some thoughts there that I never had thought of, and I think I can go back home and put wise some of the patrons of our creameries up there to do something that will do them some good. There is no question but what the thoughts he threw out in regard to a person to visit those creameries and see the way they treat the milk, that is test it, but what it's a wonderful good thought. I know creameries really right in my own neighborhood there, we are surrounded there by them, you can't drive over six or eight miles but what you run on them, that certainly need just the kind of medicine that this gentleman prescribed and I am very much pleased with the paper.

The CHAIRMAN: Are there any other remarks? If not, what is your pleasure?

PROF. SURFACE: Mr Chairman, there is one topic that I think should have just a further word of reference, it is the possibility of birds being destroyed by insects from arsenical sprays. I wish to call attention to the fact that Prof. E. H. Forbush, the State Ornithologist of Massachusetts, has, for years, been giving special attention to the study of that subject. Also for years I have been asking our friends who find dead birds to send the same to me or directly to Dr. Marshall for examination to see what was the cause of their death. We have never yet been able to find satisfactory evidence of the poisoning of birds from any spray material, and Dr. Forbush has come to the conclusion, even there in Massachusetts where they are using in their spraying, an arsenate of lead much stronger than we are using in this State, that birds are not killed by arsenical poisons. Dr. Kalbfus did not give that as his own view or opinion, and I wish to call particular attention to that because we do not want to give the impression that birds will be killed by arsenical poisoning. I mention it to this Board for the reason that in the eastern part of Pennsylvania there is a man who is trying hard to get established by the farmers, by their use of it, a certain material for insecticidal and fungicidal purposes that he claims has no poison in it and consequently, his words are, "Will not kill the birds around the premises;" and he has said that those persons who used poisons in sprays are doing great damage to the rural interests and destroying the birds. His statements are false. He is the agent for the manufacturers of the insecticide he sells. Investiga-

tions by the best scientists in the country have failed to reveal the fact that birds are killed by poison, and I have written to the best ornithologists and biologists of the country to try to get the real truth to place before you. This seems to be an opportunity to place such a statement before you and make a positive statement so that you need not fear about using your arsenical poisons for insects, on account of the possibilities of killing birds.

DR. KALBFUS: I understand that Prof. Forbush only objects to the use of poisons taken internally; he hasn't any objection to the use of poisons in spraying, but it is his idea that where it is mixed to be fed to the insects, to make mashes and feed to the cutworms and things of that kind—in those cases the birds do take the poisons and do die.

PROF. SURFACE: I again call attention to the fact that was brought out here in my report, to spread the mash very thin so that the birds will take very little of it. Where the mash is put on in quantity and the birds get it, they are killed, but where it is spread thin they are not. This is a new point that has been proven only within the past few months, that the mash should be spread on thin so that the birds will get only a little of it and not be killed. That is a new point in ornithology.

The CHAIRMAN: Our next topic is the report of the Meteorologist, Prof. Wm. G. Owens, of Lewisburg, Pa.

Prof. Owens then submitted the following report:

REPORT OF METEROLOGIST

By PROF. WM. G. OWENS.

The relation of meteorology to agriculture is the subject upon which I have been asked to speak. Meteorology is defined as "that department of natural philosophy that treats of the phenomenon of the atmosphere, especially those that relate to the weather and climate, their relations to each other and the laws to which they are subject." It would seem at first glance, that farming had nothing to do with these subjects; but a closer inspection will make it evident that the weather and climate control the precipitation and drought, and frost being determining factors upon every farm. The subject has been broadened by use, and in the government meteorological reports, I find discussed such subjects as "Domestic Water Supply;" "Hard Water and Cooking;" "County Pollution of Wells;" "Sewage and the Farm;" "Deforesting the Cause of Floods;" "Period of Plant Growth," and kindred subjects. This opens a field which is of vital importance to the farmer. Both the State and Federal governments have established observation stations within their territories where systematic records are kept and sent to the head office. These data are systematized and the results can be obtained.

There are two classes of reports; one by paid observers which are telegraphed daily to headquarters, giving the direction of the wind, temperature precipitations, barometric pressure, and any other phenomena which would help the head office to determine the movement of storms, frosts and floods. Weather charts, maps and warnings, are sent out daily to those districts most nearly affected so that the farmer and shipper can take care of his products and get them to market in the best condition. These warnings, of course, affect some classes of farmers more than others, as there are some crops which can be protected from frost or other misfortune and thus saved. Some of these warnings are said to have saved hundred of thousand of dollars in some districts.

The other class of observers are the voluntary, or, as they are now called, co-operative observers. These get no remuneration and make daily observations which are sent in duplicate to State headquarters, and they send one copy to Washington. These observations include maximum and minimum temperature and the temperature at the time of observation; amount of rain or snow in the last 24 hours; amount of snow on ground at sunset; direction of the wind, character of the day, time of killing frosts, thunder storms, halos—solar or lunar, etc. Just lately the Pennsylvania observers have been asked to report especially the forms of halos and to note the angles and appearances of sundogs, etc. I was also asked to include earthquakes and tremors, but as I have not noticed any in the last twenty or twenty-five years during which I have been observing, I do not think that will be difficult. All these observations by hundreds of stations are made to learn, if possible, the laws as well as to make possible the forecasting of the weather.

By following the weather forecasts in the daily papers, we all notice how often they miss it. But it is claimed that they are right about 90% of the time. Most people would question this figure; but I think if you will follow up the matter you will find that the failures generally occur when the prediction is "local showers" or something of that kind. That means that there will be many showers over a very limited area, and of course in the same area there will be many places where it does not rain. Here is one place where the farmer can increase his information and can predict the weather more successfully than the weather man. When there are general storm conditions extending over large areas, then uniform weather prevails. It may be clear or it may be rainy; but where local conditions prevail, mountains and river valleys, direction of wind and other circumstances will determine whether there will be rain or frost in a certain locality. By long observation and the keeping of careful records, the individual can often forecast more accurately for his locality than a person not acquainted with local conditions. It may be that weather conditions are repeated from season to season or by cycles of years. During last year I heard of two New England institutions that wished to hold out-of-door celebrations. They looked up the weather for a number of past years and found that there were certain weeks when it was generally fair. They picked out one of these periods and in both cases they had good weather.

Now I do not wish to leave the impression that I think it would be possible to always determine when there would be sunshine; but

there may be times when the weather is more likely to be fair in your community than at others. If there are such times, would it not be possible, in this age of plant breeding, to have crops ripen at such a time that good weather might be expected?

How can the farmers care for the water after it has reached the farm. There are two uses for water on the ordinary farm: That which is used for the animals and that which is used by the plants. These subjects are often discussed by the meteorological writers. The farmer often fails to give these subjects sufficient attention; Generally, I think, because he has not studied the subject. We all know that a great amount of water is necessary for the growth of plants. In Pennsylvania about 40 to 45 inches of water falls annually. This is more than enough to raise any crop that we plant, yet we often have poor crops for lack of moisture. By studying the influence of trees on certain parts of his farm, he might be able to plant them in such localities that they would hold the snow, prevent the winds from uncovering the fields and sometimes even removing the soil, and in other ways help hold the moisture till needed by the crop. Plowing in fall or spring is often a determining factor, depending on the lay of the land and the character of the soil. Knowing the time at which the precipitation is likely to occur, there is no one who should be so well prepared to know how the soil should be handled as the intelligent farmer.

Another point is the drainage. What kind of water is the farmer passing on to his neighbor or, if he is a careful man, what kind of drainage is his neighbor passing on to him. As we heard last night, if the farm above him has tubercular cows, the creek which runs through his farm will certainly be contaminated; and we all know what that means for his herd of cattle. But more important still is the water used at the house. Too many dug wells stand in the dooryard where the kitchen slops are often thrown, only to ferment and multiply disease germs which are carried into the well. Cesspools are often located near the well or on a more elevated position so that the drainage runs toward the well. In the limestone regions there are usually fissures through the rocks where the water can flow without being filtered through sand or soil. This is a fruitful source of contamination. As the country becomes more thickly populated and as our wells are used for a longer time, the drinking water is apt to become more and more exposed to contamination, and the time may not be far distant, in some localities, and may have already come in some places, where all drinking water should be boiled.

The CHAIRMAN: Are there any remarks on this topic, gentlemen?

There being no discussion, a motion to accept the report was made and carried.

The CHAIRMAN: The next is the report of the Apiarist, by Mr. H. C. Klinger, of Liverpool, Pa.

Mr. Klinger then submitted the following report:

REPORT OF APIARIST

By H. C. KLINGER.

The year 1914 will go down in agricultural history as a failure in honey production. A few sections in the south and west report a fair crop. Bees wintered well and came out of their winter quarters strong and ready for a good harvest. Prospects for a good crop were bright but did not materialize. The earlier blossoms, such as fruit bloom and locust, yielded nectar as usual; but when the clovers came into bloom a sudden drought set in and continued until the blossoms were too far gone to be helped by the return of rain. The honey carried into the hives during the early spring was consumed in brood rearing and bees lived from "hand to mouth" until late in the season. In many sections of the State fall flowers, such as the asters and golden rods, were more abundant than usual, and if it had not been for these plants, many beekeepers would have been compelled to feed sugar for winter stores.

Peculiar as it may seem, the manufacturers of supplies did a good business. The great record bearing crop of 1913 cleaned up all the supplies on hand and the earlier prospects created a demand for supplies never known before. The majority of beekeepers have a stock of goods on hand to last for another season. National legislation, which affected bee-keeping during the year, has been the operation of the net weight law. This has produced some inconvenience and has augmented the tendency to change from producing comb honey to that of extracted. This, in conjunction with the effect of the European War will cause extracted honey particularly, to become lower in price. South American and West Indian honey, which formerly went to European markets, is now being dumped on our shores and competes with our extract honey. Bee-keepers should continue to produce comb honey since it is the finer product and commands a better price.

The year 1914 has seen the installation of another school of agriculture in the United States—that of the State of Minnesota. This school has an annual appropriation of $5,000, and is separate from every other department of education. There are a number of similar schools and others giving departmental instruction in agriculture now in different states. Iowa, Oklahoma, Texas and Massachusetts each have State agricultural instruction, and the Dominion of Canada has a school at Guelph, Ontario.

What of the Keystone State? A practice not entirely new, but novel in its experience, has been more extensively carried on during the past year than ever before—that of migratory bee-keeping. A number of Northern bee-keepers sent their bees to the South last winter and brought them back again at the beginning of the Northern honey flow, thus practically making them work all the year round. The A. I. Root Company, of Ohio, sent a carload of bees to Florida in November, 1913, and brought them back last June. The shipment to Florida was one car of 300 colonies. The return ship-

ment consisted of three and one-half cars of bees. The result of the experiment was an increase from 300 to 650 colonies and 460 three frame nuclei besides 13,000 pounds of tupelo honey and the drawing out of 6,000 additional frames of foundation into nice combs. During this last fall two carloads were sent to the Dismal Swamp, in Virginia, in which the honey bearing flora is similar to that of Florida, and the season nearly the same. The result of this second venture is anxiously awaited by all practical bee-men. Another company, of Canton, Ohio, sent a carload to Appalachicola, Florida, in the fall and to-day they advertise two carloads of increase for sale.

The work of inspection of foul brood diseases has been carried on with success, considering the limited funds at command. The work is limited to the expenditure of $500 per year. This is inadequate. Repeated calls have come in from various sections of the State asking for inspection, but these had to be turned down because there were no means at hand to send any one. If the fight of this dreadful disease is to be carried on with any measure of success it will be necessary to have an appropriation sufficiently large to employ several competent men during the working season until the entire State is covered by inspection and the disease is under control.

The value of bees to the farmer and fruit grower is coming more and more into proper recognition. The once-held idea that bees were an injury to blossoms and fruit is thoroughly exploded and no longer held by intelligent persons. It is not only evident that bees are important to the fertilization of fruit, but it is now generally admitted that they are indispensable in the development of perfect fruit. In the summary of an address delivered before the Massachusetts Fruit Growers' Association, by the Assistant Pomologist, Prof. W. W. Chenoweth, is the following:

"1. All tests and observations agree that many varieties of fruit are unable to set a crop of fruit when limited to their own pollen.

2. Some varieties are partially self-sterile and a few wholly self-sterile.

3. All investigators agree, that as a rule, the fruit resulting from crossing, even in self-sterile varieties, is larger and better developed than self-fertilized fruit. Foreign pollen furnishes greater stimulus to growth.

4. All evidence at hand contradicts the theory that wind renders any dependable assistance in cross-pollenation among orchard fruits, while it does emphasize the importance of the honey bee as an agent in rendering this great service to the fruit grower.

5. It has been shown beyond dispute that spraying open blossoms with arsenical poisons is injurious to bees. Also one runs the risk of injuring the unfertilized open flowers, in addition to leaving thousands of poison cups which kill the goose which lays golden eggs."

At first and for many years the idea prevailed that bees were inimical to the fruit grower; then came the time when it was realized that the bee-keepers' and the fruit-growers' interests were mutual; now it is proven beyond the adventure of doubt, that bees are absolutely necessary for perfect pollenation of certain kinds of fruit particularly that of the apple. The famous Repp Brothers of New Jersey, with 800 acres of fruit, say they would as soon dispense with

spraying as with bees, and if they even fail to secure any honey, they claim they pay for themselves many times over. Lastly, reports have been made from different sections that bees were poisoned and in some cases whole apiaries wiped out by injudicious spraying. Notwithstanding the teaching of years, there are yet individuals so extremely ignorant and foolish as to spray trees while in bloom. Teach it. Speak it from the housetops. Cry it out in the streets. Get it into the heads of the unlearned, that NOTHING IS GAINED by spraying while trees are in bloom. A definite and emphatic law should be passed to stop this pernicious practice.

The CHAIRMAN: Gentlemen, are there any remarks. There being no remarks, this report will be accepted and filed. Our next topic is the report of the Economic Geologist, Mr. Baird Halberstadt, of Pottsville, Pa. Is he present? Mr. Halberstadt not being present, we will have the report of the Agricultural Geologist, Mr. W. H. Stout, of Pinegrove, Pa. We are all glad to meet Brother Stout.

MR. STOUT: Ladies and Gentlemen: I always feel when I appear before an audience like this that the audience will not be disappointed, because you don't expect much and I can always accommodate you. I didn't expect to be called on so soon, but it seems my colleague on this subject is not present.

Mr. Stout then presented the following report:

REPORT OF AGRICULTURAL GEOLOGIST

By W. H. STOUT.

As the time approached to prepare a topic for this meeting, I formulated in my mind, and later made notes until I had prepared what was intended to pass into history as a brilliant classic on the past and present of Agriculture. Upon receiving notice that the time assigned me, about 15 minutes, from 11.45 A. M., when everybody is hungry and getting ready for dinner, I had to revise, condense, reconstruct and abbreviate until little remains but a disjointed part, after cutting out so much. Some may even think it might have all been cut out except the title.

Jdgs. 12,-5: Ephraimites could not pronounce like the men of Gilead, so there were slain 42,000.

Just what to offer on an occasion like the present without repeating what has been said before, taxes one's mind, and to present it in an acceptable manner before an intelligent audience like the one assembled here is no easy task. Sometimes listeners are over sensitive and critical which adds to the embarrassment. It is not considered good taste nor *genteel* to use the personal pronoun in writing or speaking. However, personal experience and knowledge obtained in the pursuit of a calling or occupation should be of more value than that absorbed from others at second hand, or from theory. If

it happens that the personal pronoun appears in this paper, it is not with a design of vanity or egotism. Depending upon one's own resources after graduating from our early common schools, after seven three months' terms, afford little mental training and a poor equipment with which to meet the struggle for an existence or a place in the Sun during three score years plus ten and four.

Knowledge is power and a foundation upon which to build is a valuable asset if the building is not neglected after the foundation is laid. Reflecting upon all the dangers passed through during the time allotted us in Scripture, it makes one shudder to think of the dangers of the measles, whooping cough and more fatal afflictions, including earthquakes, reptiles, bacteria germs, flies and mosquitoes. It is quite surprising that any remain to tell the tale after eating and drinking flies so many times. It seems necessary to pinch one's anatomy to find whether or not the spirit and the flesh have not parted. We have been told before now all about the independence of farm life, the ease and comfort enjoyed; swinging in hammock under the blossoming apple tree, where the bees hum in happy contentment, where the birds chirp and the butterflies in gaudy colors flit to and fro sipping nectar from the fragrant blossoms; how the auto speeds to the seashore or the yacht sails us over the briny deep; how the office seekers love us before the election and "cuss" us afterwards; how the banks are overflowing with deposits and money lenders standing on street corners offering loans on first mortgages to 50% of the value of property, then hypothecate the bonds with the U. S. Treasurer, getting currency for the same to loan to the people, getting the interest from mortgages on one hand and the discount from borrowers on the other hand.

Forty years steady practice in redeeming an exhausted farm to a productive condition and more than fifty years observation at various times while traveling over Pennsylvania, New Jersey, Delaware, Maryland and a little in other states has taught me some things useful. From ocean level to more than 2,000 feet elevation in various directions, from the hot sands of the sea coast to the cool breezes of the high plateaus, evidence climatic differences according to elevation and the variations of soils indicate the best suited locations for various crops. Trending northeast and southwest, the mountain ranges, hills and valleys run parallel, forming long stretches of the same soil. From the present time to the long past there are more than forty distinct deposits of clay, sandstone, shale, limestone, conglomerate, muck, peat, glacial and volcanic deposits, each differing from the others in texture, and fineness from solid rocks to particles of dust. These contain some eighty known elements of which, however, a few are of importance in agriculture, only seven always essential for crop production being, nitrogen, phosphoric acid, potash, lime, iron, sulphur and magnesia. The latter is contained in some lime and is regarded as injurious to plants if used too freely.

The problem of soil fertility is confronting farmers in many of the older states and is becoming manifest also in the Western and Northwestern States where the soil was once considered inexhaustible; where, not long ago, manure and straw were considered as an encumbrance, it is now found a valuable asset. Even commercial fer-

tilizers are found useful. Nearly all the states use more or less commercial fertilizer, and the entire country, as shown by the latest statistics, uses to the value of $137,360,000 worth in one year. Pennsylvania reports 340,000 tons used in 1913, which, if valued at $20 per ton, amounts to $6,800,000. It costs the farmers about half the value of the potato crop, at fifty cents a bushel, or the value of all the apples for the fertilizer used. Adding to the fertilizer account the cost of manure and lime increase the expense very materially to maintain the fertility of the soil which naturally reflects upon the high cost of living. To transport the fertilizer used in this State, in 1913, required 34,000 cars of 20 tons each, and the average freight rate is $2 per ton, the railroad collects $680,000 for transportation, aside from other material and the increased crops produced by its use.

The railroads found the promotion of agriculture a bonanza and encourage it by running instruction trains over their lines, even engaging experts to promote the industry which is, however, not done out of charity or benevolence. If instead of appealing to the Interstate Commerce Commission for permission to increase freight and passenger rates to and from the farms, it would benefit the general public and save the companies the expense of operating expensive outfits on their lines to teach their employees and town folks agriculture. It is really surprising the interest manifested in agriculture by merchants, politicians, lawyers, doctors, bankers, railroad officials, promoters, organizers, demonstrators, rural up-lifters, experts, surveyors, engineers, economists, instructors, theorists, road cranks, magazine scribblers, even daily newspapers from the office on the top of sky-scrapers, fulminate full page editorials ridiculing farmers and their methods because the farm products are not equal to those of England, France, Holland, Belgium, Germany and other countries that are densely populated and whose farmers are poor. The pitiful conditions now existing in those foreign countries appear to indicate that civilizaton is reverting into savagery. Belgium was one vast market garden without fences, boundaries being marked by little trenches. Now it is practically ruined. The women and children perform much of the labor on the fields in foreign countries; a condition not to be envied, but coming here as sure as fate under prevailing political and economic conditions.

FARMING THE FARMERS

The woods are full of self-sacrificing patriots, and more are constantly incubating to gain a place on the State or National pay roll to avoid the drudgery of farm life and draw salaries from two to six thousand dollars a year and expenses. Some of the economists, seeing a worn out piece of machinery in a field, from a palace car window, or an auto car, get the inspiration for a topic to preach a sermon from the platform on the shiftlessness of farmers, their indolence and ignorance. Because of the limited income of $1,500 average farm, a farm out of which to meet all expenses, the farmer has less for himself than a common laborer; yet they are chastized for having unpainted buildings, no lawns, no bathrooms, and none of the modern conveniences of the millionaire agriculturist. The

sum total of the value of agricultural products in this country of vast area seems immense in figures; but it is all consumed from year to year, and calamity howlers already anticipate starvation in the near future unless farmers can be encouraged to produce *more*. This little word of four letters has such an attractive, enticing, inviting, tempting, seductive sound that it has become the shibboleth of politicians, lawmakers and office holders by which they thrive and conquer if accompanied by the dollar mark. More appropriations, more salaries, more crops, more privileges, more power, more boodle, more graft; while the word *less* is forgotten, appearing only when labor and farming interests are involved.

The fact that farming is not remunerative commensurate with the investment and labor employed, and it is too strenuous an occupation as an investment is evident. You may sing and shout at the top of your voice, "Stay on the farm boys, stay on the farm:" they get away at the first opportunity and will continue unless conditions are modified. If those who advise other to stick to the farm would seek employment on the land and prove what they preach, it would be an encouragement to those who seek other occupations, crowding into towns and cities to find more congenial employment. Double the crops and give them away, as for instance the cotton, potato and apple crop, at less than cost, it is no incentive to produce more. Were it not for the misfortune of the eastern hemisphere, grain to day would unquestionably be selling at panic prices. Practical farmers understand that the larger the crop removed, the more fertility is lost to the soil; that if one bushel of grain removes 25c. worth, two bushels remove 50c. worth. They also know that much of an article is often worth less than a smaller quantity of the same. This fact was forcibly demonstrated when the controversy about the money standard was an issue, when 420 grs. of silver in a trade dollar was worth about $\frac{2}{3}$ as much as a standard silver coin with only $412\frac{1}{2}$ grains. In this case government law regulates the value, while the value of crops is regulated by the law of supply and demand. The adoption of the gold standard was the most cruel and damnable law ever inflicted upon the people, which will prove itself by and by.

Notwithstanding the views expressed in this topic, there never was a time when the opportunities in agriculture in some directions were as favorable as the present, for a young man of good address with a diploma and a title of Prof., Doctor, or an abbreviation such as B. L., B. L. L., A. B., D. F. P., F. E. S., F. B. S. S., F. G. S., F. H. S., F. L. S., E. P. S., M. P. S., ect., to which sometimes D. F., would be appropriate. Equipped with a diploma, a few strips of litmus paper, a little hydrochloric acid, a few text-books on agriculture, some bulletins, Prof. Bailey's cyclopedia of agriculture, a good memory, a little Latin are the passports of remunerative positions under the State or National auspices.

Not long ago discussions were long and warm about Canadian reciprocity, when the farmers' market was to be extended and a reciprocal trade established for farmers to obtain cheap lumber, pickets, lath, and toothpicks. Cheap mowers and reapers, cutlery and tropical fruit, and best of all, cheap wire fencing. President Lincoln did not understand the farmer's mentality when he spoke of fooling the people; some all the time, some part of the time, and all

the whole time. Since other interests are so much interested in agriculture, it would be only fair to reciprocate by sparing some experts to send among railroads to each economy; to the mine operators to advise them to operate full time and double their output; to the steel trust and manufacturers to teach them how to create prosperity by peddling their product over the countrylike farm produce or place it in the hands of commission houses. It would be good policy and economy if State and National administrations, would engage time keepers and restrict pay to the time of actual duty and not pay the time to high priced officials; $10 to $25 per day while they are away fishing, hunting, attending political meetings and electioneering. It would pay many times the cost of maintaining time clerks and facilitate public business.

It is hardly fair to mention present conditions without reference to the past. It is not so very long since farmers were regarded as low class citizens and treated as serfs and slaves. The rulers of nations and governments who claimed to rule by Divine right made vassals of their subjects and the tiller of the soil a menial of low degree. Since the settlement of this country, those who escaped from monarchial rule and persecution devised a more liberal form of government, supposed to be founded on the principle of equal opportunity for all and special privilege to none. It is only within recent years that we heard of agents of Divine providence backed by Morgan influences and tainted money as guardians and protectors of the working class of these United States. The same influence and agencies it seems now propose to take the farmers under their protective wings and dictate under what laws and regulations they may conduct their affairs or themselves. Looking back to the time of the spinning wheel, the knitting needle, the hand loom, the cradle and scythe and hand rake and the flail, to homespun and Kentucky jeans seems a far cry. The old log school house in the corner of the forest where wild beasts yet roamed is of this generation. The square room with a ten-plate wood stove in the center, and the seats ranged along the sides facing the wall, where boys and girls from seven to twenty years of age assembled studying and reciting in the one class, the studying of German lessons, of inspiration and morality from the Testament and the Book of Psalms. Handicapped for want of teachers to teach English, it was only remedied when so called Yankee teachers could be secured for a small salary and the privilege of "boarding around" from family to family under all sorts of conveniences and inconveniences. No three dollar a day hostleries to reach after midnight where menu cards, pretty servants and silverware are such an attraction to public servants on the payroll of a State. The time of rye bread, mush and milk, fat pork, N. O. molasses, cowhide boots for men and women, frequently barefoot from early spring to late fall, causing stone bruises and missing toe nails to mourn over are almost forgotten by this generation.

Those were the good old times when wheat sold at fifty cents a bushel, potatoes at no price, hay $5 to $8 per ton, eggs a dozen for a fi' penny bit, or ten cents a score, labor 50c. a day. The high cost of living was not a troublesome question, neither were woman suffrage, local option, prohibition and trust and trust busters agitating the people. Whisky of the good old kind (rye and apple) sold at five

cents a quart and was considered a necessity, especially in the harvest field, along with big fat cherry and raspberry pies, onions, radishes, pickles and rye bread for lunch. The crops raised on virgin soil would now be envy of the most eloquent modern institute speaker on soils, soil fertility, cowpeas, soy beans, crimson clover and alfalfa. There were no breakfast foods, canned beans, canned salmon, pressed ham, fried potatoes, canned corn, tomatoes, beans, post toasties, corn flakes, shredded wheat biscuits and other costly luxuries to create the high cost of living. The butcher, baker and grocer did not visit rural districts daily and the laundry man taking the farmers' linen would have had to travel over an entire township to secure enough shirts, skirts and collars for a half day's washing. The things now so convenient and costly create idleness and evils that are reflected in divorce proceedings and family feuds. In the past as in the present some families raised boys that were incorrigible and too lazy and cunning to work; these, if it could be afforded, were sent away to an academy and to college to become the pride of the neighborhood as doctors, lawyers, professors, legislators, bosses and aristocrats by virtue of a diploma and divine right.

Things were different before that race destroying innovation, the auto, was introduced. So long as husking-matches, snitzing parties, country dances and spelling-bees were a feature in rural affairs, there were fewer maiden ladies and bachelors abroad in the land. To-day the farmer dares to rub up against the *elite* of society even to the "400," and to discount them in good sense, intelligence, morality and the economy of nature. Farmers are preservers of the human race, although they may be tolerated as a necessity and regarded as a necessary evil, and disturbers of the criminal cunning. It is time that they appreciate their importance and unite in a common cause for their own betterment, in the interest of universal peace, and the alleviation of the distressed at home and abroad. It is time to protest against the uncalled for activities of a class of self-constituted guardians of agriculture and rural affairs, and against the centralizing in expensive departments and an army of supernumeraries not desired, never asked for or demanded. There were no petitions circulated and signed by the people to have inflicted on the tax payers, a horde of hungry aspirants to public employment tumbling over one another for the coveted prize.

It is becoming so with all the departments, divisions, agents, inspectors and law that one cannot feel safe to make a concrete walk, behead a fowl, kill a calf, or catch a fish, without a permit for fear of conflicting with some restraining authority or provision emanating from the mind of someone whose experience and mental training was derived from watching the shadows of towers and tall buildings in some city office, before a roll top desk on a revolving chair. It would make a very interesting picture if the thoughts of those who manifest so much concern about agriculture could be photographed and displayed on a reel as moving pictures and the motive back of their activities analyzed. If it were possible to open the cranium and close them without injury, to study the convolutions of their brain, the blood corpuscles coursing through their bodies, and the composition of their brain cells to learn the proportion of nitrogen, hydrogen and oxygen, it would possibly show an excess of one of the

gases, an abnormal condition conducive to farmomania an indistinguished germ producing an epidemic. "Farmonania: A mental aberration, a hallucination, a phantasy, a brain storm on rural economics." Realizing fully that the reflections in this topic will by a few be regarded as emanating from an obstructionist and fault finder, the facts are unchallengeable with which the general public will agree, especially practical farmers.

Agriculture is a gamble and superlative industry reflected in all lines of business, in stock exchanges and financial centers. While the world stands in awe at the destruction of life and property in Europe, the hand of charity is extended to the suffering, at the same time a class of unchristian and uncharitable few are beginning to speculate in business on the future and even present demands, hoping to profit from the most cruel, unholy and uncalled for war in the history of the world. It is hardly to be expected that impoverished countries and dead people will be good customers:

"May every year but bring more near
The time when strife shall cease,
When truth and love, all hearts shall move,
To live in joy and peace.
Nor sorrow reigns and earth complains,
For folly still her power maintains;
But the day shall yet appear,
When the might with the right and truth shall be;
And come what may, to stand in the way,
That day the world shall see."

The CHAIRMAN: Is there any discussion on this paper. If not, what will you do with it?

The SECRETARY: I move the adoption of the paper read and its publication in the proceedings.

The motion was seconded and carried.

The SECRETARY: I wish to ask that nobody retire from the room, if it can be avoided, because there will be some announcements to make as to future meetings, and these will be made at the close of the session.

MR. JOHN A. WOODWARD: Is there opportunity at this time to make an announcement and present a resolution?

The CHAIRMAN: I think it would be proper.

MR. WOODWARD: If you please, Mr. Chairman, it has been learned with a very deep regret that the cause of the absence of the Chief Chemist this morning and the failure to have that paper presented, is the sudden death of his father-in-law, Mr. Edward Martin of this city, who, while on his way westward from this city on the early train this morning, suddenly died about Newport, on the Pennsylvania train. In view of that, I ask leave to present the following preamble and resolution:

"WHEREAS, Information has just been received this morning of the death of Edward Martin, of this city, father-in-law of the Chief Chemist of the Department of Agriculture, Prof. J. W. Kellogg, and

WHEREAS, Prof. Kellogg has thereby been prevented from being present and taking his part in the proceedings of this session of the State Board of Agriculture,

THEREFORE BE IT RESOLVED, That this Board of Agriculture extend to Prof. Kellogg and his afflicted wife their sincere sympathy in their hour of distress and commend them to the care of the All Wise Father who softens bereavement."

I move the adoption of this resolution by a standing vote.

The motion was seconded and the resolution was adopted by a standing vote.

The CHAIRMAN: Mr. Baird Halberstadt, Economic Geologist, is now present.

Mr. Halberstadt then presented the following report:

REPORT OF ECONOMIC GEOLOGIST

By BAIRD HALBERSTADT

A perusal of the excellent inaugural addess of Governor Brumbaugh, upon assuming the reins of government, indicates very plainly that a complete reorganization of the several departments of the State has become a necessity, and that it is his desire that such reorganizations take place without unnecessary delay, so that a better conduct of the business affairs of the Commonwealth may be instituted promptly. It is his further desire, that for every dollar appropriated by the State, its citizens shall receive a full dollar's worth. That this change will involve the State Board of Agriculture is quite probable, but to what extent and in what direction the change will be carried out can as yet only be surmised. It is patent, however, that the new Executive desires the elimination of all ornamental or useless officials in all departments, and that the money hereafter to be appropriated shall be used to the very best advantage or as he has aptly said in his reference to "Our Farms:" "The funds for the advancement of our agricultural interests ought to express themselves much more largely in wheat, corn and potatoes and less in clerical and other forms of routine service. Let us legislate for the farmer rather than for the office holder." In this, the Governor deserves and should have the hearty support of, not only every farmer, but likewise that of every well meaning citizen of the Commonwealth.

Seven years ago, without either my knowledge or consent, the Executive Committee of this body elected me one of its Consulting Spe-

cialists, assigning to me the work of the Mineralogist and later electing me Economic Geologist. As such, it was my province to be at the beck and call of any farmer in the State for the identification of minerals and advice along geologic lines. During these seven years, many letters asking for advice, etc., have been written to me from various parts of the State. Each and every one of them has received prompt and careful attention, and was answered as fully and as explicitly as if they had been sent to me by regular paying clients. For this service, not a dollar was either asked or received, nor have I been remunerated, for postage, stationery, clerk hire or for the return charges on specimens forwarded for examination. Several cases have been brought to my attention, wherein farmers at the instance of others, have taken advantage of this gratuitous service by writing for information, and later, giving it to others, who could and should have paid for the professional services rendered. Should it so happen, that the staff of Consulting Specialists be abolished, the writer will have no regrets, but will retire with the satisfaction of having conscientiously performed each and every duty assigned to him, and that, if his advice has been followed, he has effected a saving of thousands of dollars to the farmers of Pennsylvania by advising them against prospecting for minerals in localities where there was no probability of finding them and by repeatedly warning them against men claiming to be experts, some of whom assume misleading titles without any warrant whatsoever. In fact, the State offices they claim to fill do not now nor ever did exist.

Numerous instances have been brought to our attention, wherein farmers and others have been badly advised and now mourn the loss of both time and money. Investigations of these has brought out the fact that some were due to incompetency upon the part of the adviser, others to a lack of knowledge on the part of the prospectors, while in others, there was a decided element of fraud. In one case, it was found that farmers were being solicited to buy stock in a coal mine not far from the Capitol. Of this operation, I made, at the request of some clients, a thorough examination, after which I was shown an elaborate prospectus that had been prepared by the promoters of the scheme. At the time of my visit, I met there some farmers and business men, who had gone to investigate this wonderful (?) operation. A few moment's investigation sufficed to show that carbonaceous deposit was not within the Coal Measures and that any attempts to mine the deposit would result in financial disaster. This conclusion has since been verified and the $15,000 sunk is gone forever, unless the experience was worth it and will be profited by, for these men, like the boy who fooled around the business end of a mule, don't look quite so well, but they have a good deal more sense. We have also been called upon for opinions as to the probability of finding petroleum in paying quantities in Lehigh, Schuylkill, Carbon and Luzerne counties. Our advice was unheeded. Wells were sunk but no oil was found, nor was there the slightest possibility of finding it in these localities, nevertheless thousands of dollars were expended in drilling and the dupes of the promoters are poorer but wiser men. From talks I have had with the farmers and others in many districts or sections of the State, I am inclined to believe that a great amount of money is wasted, annually, in Pennsyl-

vania in the injudicious selection of fertilizers. By this I mean, that in many cases, complete fertilizers that have given good results and entire satisfaction in one section are selected for use in other sections whose soils are markedly different in structure and composition, the selection being made solely because good results were obtained elsewhere. Because a certain brand of fertilizer gives good results in the Lebanon Valley, it does not follow that results equally as good will be obtained by its use in the valley of the Schuylkill, for the reason that the soils are dissimilar in structure and composition. In other words, it might be said, that a medicine for one disease is being used, while the patient is suffering from one entirely different. The chemist is able to analyze soils and tell you the exact amount of each constituent, but as far as I have been able to learn, he is unable to tell how much of it is available or in condition to be absorbed by the plant. About the only thing left for the farmer to do is to make plant tests; a method that requires a number of years to carry out. A second plan is to make what was called basket tests, requiring but a month at the most to complete. The value of this method is questioned by some well informed men, while others equally well informed give it their unqualified approval. All, however, agree that the results as shown by this method are much surer guides than the "farmers' guess" in the selection of a fertilizer.

It must be patent to all observers that avoidable waste due to the lack of care of the barnyard manure is enormous. Dr. Van Slyke of the New York Experiment Station has estimated that the loss to the farmers of the United States from this source alone exceeds seven hundred million ($700,000,000) dollars, annually, or the value of a crop. Perhaps some of this waste is unavoidable; the greater part of it, however, *is avoidable*. The value of the wasted material is seemingly fabulous, but when the case is investigated, it will be found that the estimate of Dr. Van Slyke is not only reasonable but is based upon facts and figures, that can be relied upon. These figures are almost fabulous and the losses appalling.

Let us examine into the matter and we will see that the results are not overdrawn and that it is "a condition and not a theory confronting us." The United States Department of Agriculture has estimated the annual value of manure of livestock, if preserved, per animal, as follows:

Horse manure,	$27 00
Cattle manure,	19 00
Hog manure,	12 00
Sheep manure,	2 00

The losses due to exposure through leaching, washing away and evaporation are tremendous, as has been demonstrated by Roberts in his experimentation extending over many years, and Dr. Taylor has published tables showing the percentages of loss in both gross weight and in plant food, as well as the financial loss. The first table gives the losses in horse manure placed in a pile and the second is of cow manure. They are as follows:

TABLE NO. 1

	April 25th. Pounds.	September 25th. Pounds.	Loss. Per cent..
Gross weight,	4,000	1,730	57
Nitrogen,	19.60	7.79	60
Phosphoric acid,	14.80	7.79	47
Potash,	36.00	8.65	76
Value per ton,	$2 80	$1 06	62

TABLE NO. 2

	April 25th. Pounds.	September 25th. Pounds.	Loss. Per cent..
Gross weight,	10,000	5,125	49
Nitrogen,	47	28	41
Phosphoric acid,	32	26	19
Potash,	48	44	8
Value per ton,	$2 29	$1 60	30

While on a trip last summer, I visited a farm where the farm house was modern; it is well heated, the owner has his own gas plant, hot and cold water, and, in fact, all modern conveniences. The barn and outbuildings were in splendid condition, in fact, one would have judged the owner to have been an up-to-date, prosperous farmer. A further examination developed the fact that he had an old fashioned barnyard in which the manure was thrown, when removed from the barn, seeping between the stone wall between it and the highway, and ultimately finding its way into and polluting the creek was found a stream of rich brown liquid, the drainage of his barnyard. Based upon the following prices: Nitrogen at 18 cents, phosphoric acid 5 cents and potash at 5 cents, that liquid or drainage from this manure heap was worth $10.40 per ton. That man was not only losing money, but was, unthinkingly, perhaps, seriously polluting a stream of good water. Each ton of drainage from a manure heap, it has been estimated, contains thirty (30) pounds of nitrogen, two (2) pounds of phosphoric acid and ninety-eight (98) pounds of potash.

In striking contrast were the conditions found on the farm of my friend and colleague, Mr. William H. Stout, on his "Fairview Farm." His manure pit is a wagon with a tight box, a concrete gutter at the

rear of the stalls conveys the liquid excrement to a tank. Every day or two, the manure, after the liquid has been poured over it, is hauled out to and deposited where needed on the fields, and this is done the year around. The solid and liquid manure from the hog pens is drawn into a concrete tank and mixed with an absorbent. All the droppings from the poultry houses are carefully preserved. Mr. Stout was, I believe, one of the first, if not the first man, in his section to spread the manure on his fields at once, instead of throwing it out into a pit or barnyard, where it would again have to be handled a second time in loading. It was due to these saving methods, that Mr. Stout was able to transform a wornout farm into a productive one; to increase the yields of his fields from one-half ton to three (3) tons of hay per acre, and his yield of wheat from nothing to twenty (20) to twenty-five (25) bushels, his oats to twenty-three (23) bushels, corn, seventy (70) bushels and potatoes to two hundred and twenty-five (225) bushels per acre, and these on fields that, in his first year, the crops were practically a failure. Another thing he did was to lay five (5) miles of stone and tile drains in marshy fields; the result is that he is cutting three (3) tons of hay per acre, where before nothing would grow but swamp plants and grasses. Here is a farmer who works with his head as well as his hands, a practical scientific farmer, as it were. Without the reading and studying of scientific works, government bulletins and farm journals, he could not have accomplished these results, but would have given up in despair.

The government, Federal and State, are doing more for the farmers than for any other class of citizens. By an expenditure of a few cents for postal cards, the Department of Agriculture will, without further expense, send to any farmer in the country a practically complete library on agriculture and cognate subjects for the asking. The time has gone by, when the farmer is looked down upon, if he ever really was, for the public, as it becomes more highly educated, will appreciate how great a factor the farmer is in our lives. Without farmers, famine would be upon us. The farmer of to-morrow must know much about science if he would succeed. Our fields have been robbed of much of their fertility and this must be restored if this nation is to survive. Many farms, now worn out and abandoned, must be restored, or we will be unable to feed the rapidly increasing population of non-producers. The enormous exports of grain and of livestock to foreign lands will cost this country dear in the end, for, as that great Agriculturist Chemist, Justus von Liebig, has observed: "The manure produced in the course of farming is not sufficient to maintain, permanently, the fertility of a farm; it lacks the constituents which are annually sold in the shape of grain, hay, milk and live stock." A few days ago, a dispatch appeared in the "public press," setting forth that 40,000 horses had been sold in the West for exportation abroad. That single shipment of horses will cause a loss of over $1,000,000 to us in the value of the manure they would have produced during the present year, had they remained in this country.

I have observed here, that I have served as one of your Consulting Specialists without financial remuneration, and willingly, for the delightful associations with you all and the warm and lasting

friendships I have contracted among you, pay me infinitely more than any financial reward, and should the staff of Specialists be abolished, my only regret will be in the breaking off of our pleasant official relations.

The CHAIRMAN: Gentlemen, I understand that we are somewhat slow in our schedule work. If there is no objection, this report will be accepted and filed with our proceedings.

The SECRETARY: I think it is very important, if it be possible, that we get a report from the Executive Committee before we adjourn, particularly for the reason that the Committee on Resolutions will have a little time to talk over matters that are possibly ready to go into their hands and make some arrangements for their meeting.

The CHAIRMAN: Gentlemen, I see the Chairman, Mr. Blyholder is here, and we will receive the report.

MR. BLYHOLDER: We are not altogether ready to give a report yet, in full; but we are ready to announce the Committee on Resolutions and we will do that at this time, and in the afternoon, if called upon, we will be ready to report in full. The Committee on Resolutions are J. Aldus Herr, John A. Woodward, B. F. Killam, George G. Hutchison and M. M. Naginey.

The SECRETARY: I move the adoption of this partial report of the Executive Committee, naming the Committee on Resolutions.

The motion was seconded and carried.

The SECRETARY: If I have leave, I would like to make two or three announcements. I am requested to announce that the Jersey Cattle Breeders will meet in the room below here Thursday morning at ten o'clock. All breeders of Jersey cattle are invited to be present. The Pennsylvania Berkshire Breeders' Association will meet in this hall on Thurdsay afternoon upon the adjournment of the State Board of Agriculture. The Sheep Breeders of Pennsylvania will meet in this room Thursday afternoon immediately following the meeting of the Berkshire Breeders. Mr. George H. Kent, who is the representative of the American Press Association, requests that all the members of the Board and those who are here as visitors attending this meeting shall stop for just a moment when you pass out, in order that there may be a negative taken for your photograph. Mr. Kent stated to me that the Governor of the Commonwealth, who is the president of the Board, will be here in time to get into the group if possible. I scarcely think that possible, but we may not regard it as impossible. Now the request is that you will stop just outside, as you go down the steps and get out in the street that you stop there for just a few minutes, in order that Mr. Kent may have the opportunity of getting this negative.

The CHAIRMAN: Is there anything further. There being no further business, we now stand adjourned until 1.30.

WEDNESDAY AFTERNOON.

The Board met, pursuant to adjournment, January 27, at 1.30 P. M. Vice-President Kerrick in the Chair.

The CHAIRMAN: Will the meeting please come to order? Is the Executive Committe ready to report? Mr. Blyholder, are you ready to report?

MR. BLYHOLDER: I am.

The CHAIRMAN: We will hear the Executive Committee's report.

MR. BLYHOLDER: After consultation, the Executive Committee made the following appointments:

(See Page 5.)

The CHAIRMAN: Gentlemen, you have heard the report; what is your pleasure?

The SECRETARY: I move the adoption of the report.

The motion was seconded and carried.

The CHAIRMAN: Reports of Specialists and Standing Committees: Livestock, W. C. Black, Chairman.

Mr. Black then submitted the following report:

REPORT OF COMMITTEE ON LIVESTOCK

By WILLIAM C. BLACK, *Chairman.*

"A condition and not a theory" confronts us. The people of Pennsylvania are in a dilemma. They can choose either horn; to soon become vegetarians or to breed and feed on their farms more meat producing animals. The population of the United States has increased 20 per cent. in the last decade and the number of meat-producing animals has decreased in about the same ratio. The spread between meat production and meat consumption under existing conditions, must become wider and wider as the years go by. Not only the United States but the whole world is facing a famine in meats, shoes and warm clothing. One county in Pennsylvania has increased 151 per cent. in population in the last 20 years. In my own county, on what was a farm, in three years, was built a town of 9,000 people. It is predicted that when this European war is over there will be a great influx of immigrants to the United States. The large increase in population is almost entirely of the

consuming class. Under such conditions it is not surprising that only plutocrats and high salaried people, such as County Chairmen of Farmer's Institutes can afford meat for dinner.

When the "powers that be," ordained that we should have Free Trade in the United States, the stockmen were paralyzed. They saw vast numbers of livestock crossing our northern border from Canada. They saw vast fleets of merchant vessels, loaded to the gunwale, with meat from Argentina and Australia; they saw our meat market demoralized and our livestock men ruined. What has been the result? The year 1914 has shown the highest average price for livestock ever recorded in the United States. The shortage in Canada is greater than in this country. During 1914 at one time, cattle sold higher in Toronto than in the United States. During the first three months of free trade, there came across the wide waters enough meat to make one dinner for each person in the United States.

The causes of the high prices of meat are many. I mention but few of them. The sub-division of ranges into farms, and ranches for so-called dry farming. The overstocking of the ranges until they carry but a small per cent. of the livestock formerly carried. The large increase in the dairy industry, which is a negligible factor in the meat supply; the high cost of incompetent labor; the slaughter of the innocents, roaster pigs, veal calves, baby beeves; the greatly increased value of land in the corn belt, and the consequent high cost of feed. The telephone also adds to the high cost of meat. The resident of the town sits in a cozy room and orders by telephone a pound of steak or a small roast which is delivered by a high salaried driver in a high price motor truck, and the account is charged on the butcher's book by a high salaried clerk. When the bill is rendered, it is not surprising that the head of the house curses the beef trust, the railroad corporation, the butcher and all down the line even to the livestock breeder, who is quite sure is getting rich too quick.

The condition is alarming; what is the remedy? Animal husbandry and agriculture are indissolubly linked with national prosperity. We must replenish our herds from within our own borders. No other source is available. In the beginning we must retain for breeding purposes all suitable females, and use sires of good blood and feed generously. Breed and feed are as inseparable as were the Siamese twins. Our herds and flocks can only be replenished by Nature's slow process, and an expert sent by the United States Department reports that not before 10 years can beef production become normal. Save the innocents and care for them until they reach a reasonable degree of maturity, not selling pigs as roasters but as more mature animals. A neighbor had a sow that produced ten pigs; another had one which produced twenty-four at one birth, but that is another story. The ten pigs were sold as roasters at eight to ten weeks old for $30 or an average of $3.00 each. Had these pigs been kept approximately one year old, either one of them should have produced as much meat as the ten roasters and would have sold for as much money, and would have paid a good profit on the feed consumed. Lambs are sold, when weighing from forty to eighty pounds. They should be kept one year longer and the best

ewe lambs retained as breeders. And the culls and wethers sold furnishing a much greater quantity of meat, and having paid a good profit on feed consumed. Calves of the beef breeds and their grades should be kept until maturity, when they will furnish many times as much meat as will veals, and will pay a good profit on feed consumed. I have not counted the labor for caring for the stock, as any farmer who wishes to retain fertility on his farm will furnish the labor for the manure for the feed consumed.

It is essential to success that only pure bred males be used and these should be of individual excellence coupled with a good pedigree. The choice of a breed is a matter of individual preference and environment. In many cases environment is the controlling factor. There is no best breed. There is no battle of the breeds. There is no conflict between breeders of the Jersey and Guernsey and Holstein, of Angus and Hereford and Short-horn cattle. There is no conflict between breeders of long wool, medium wool or merino sheep. No conflict between breeders of black hogs and white hogs. Let us then as breeders of livestock, not in conflict with one another, but in solid phalanx, shoulder to shoulder, make one grand effort in a war of extermination against the scrubs.

The future looks bright to the livestock breeders in Pennsylvania. Success depends on his efforts. A vast population must be fed. Pennsylvania has, within her borders, resources sufficient to meet the demand. May the farmers and livestock breeders of the Keystone State seize this opportunity and secure for themselves millions in money and largely increased fertility for their farms.

The CHAIRMAN: Is there any discussion on this topic? If there is no objection, this report will be received and filed with our proceedings.

MR. LOHR: I rise at this time to inquire whether this body is now ready to consider and decide upon a place for our next annual Spring meeting? If so, we will be pleased to have invitations for the same.

The CHAIRMAN: I think a motion is in order at any time.

MR. LOHR: I move that that matter be taken up and we entertain invitations.

The motion was seconded and adopted.

The CHAIRMAN: We are now ready for nominations.

MR. THROOP (of Crawford County): I come to extend an invitation to the Board to hold its Spring Meeting at Conneaut Lake. We will open the park one week sooner than heretofore and I want to say to you that we have ample room and accommodations for all of you who come. We have the Conneaut Hotel of 400 rooms and the Virginia, just across the street, with 300. We will furnish you with all the entertainment you want outside of your own meetings, furnish you with an auditorium to hold your meetings in, and, furthermore, you can get accommodations from $1.50 to $4.00 per day. You can get accommodations in the Conneaut Hotel for $2.50 a day, in the Virginia Hotel for $2.00 and in the cottages for $1.50. If

you will favor us with your meeting, for those coming by way of Pittsburgh, we will get you a $4.00 rate for the round trip from Pittsburgh, good for a week. It is very easy to get to the Exposition Park by way of Meadville, over the Erie, or by way of Bessemer, over the Pennsylvania line. My neighbor and friend, Mr. Campbell, is here and can back up this invitation a great deal stronger than I can.

MR. CAMPBELL: I represent the Institute part of it and I want to say that we do extend a most hearty invitation to you to come up into western Crawford county for the Spring Meeting, because we have acquired at least a little reputation for entertainment and we are doing some things along agricultural lines in western Crawford county, and we are livening the work up there very considerable and I am sure if you will come up there with your meeting, we will take care of you in good shape and show you that we are alive along agricultural lines and are able to entertain you as well as you will be entertained anywhere else in the State of Pennsylvania.

MR. A. J. KAHLER: I place in nomination Williamsport. As has already been said, we can give you ample accommodations in the way of hotels. We have as good a hotel as any in the Commonwealth. Williamsport is a railroad center; it is the center of the State; you have never had a meeting there, you have run all around it but have never met there and we would be very much pleased to have you come to the City of Williamsport.

MR. JOEL A. HERR: It is a long time ago that we had a meeting of this body at Lock Haven. We are central, we have excellent hotels and enough of them, it is a good place to meet and nobody ever came to Lock Haven and went away dissatisfied with a meeting of this kind, and I will extend a cordial invitation for the Board to meet at Lock Haven. It is not likely that half a dozen members would vote to go to Williamsport after they had met in Lock Haven, and I think we have better hotels for the money than you can find almost anywhere in the State, and when the Board met there, it met at a less average expense than any other meeting in the State, and I think it is right that it should come right to the center of the State in Lock Haven.

The CHAIRMAN: I think the worthy Secretary has some suggestions.

The SECRETARY: Oh, no.

The CHAIRMAN: Well, the worthy Secretary is a privileged character here.

The SECRETARY: I simply remarked to the Chairman that there was some talk about making Lock Haven dry and I think we should help that cause if we'd go up there. Now I want to tell you that he has violated my confidence.

MR. JOEL A. HERR: It is not dry yet and won't be till we meet there next time.

MR. STOUT: I want to invite you to come to Pottsville. We have an abundance of saloons and you need not suffer any inconvenience in consequence of being dry. We have 1,200 saloons in the county and more applicants. We have good hotel accommodations and we have a large jail, and an insane asylum and all the modern outfit and equipment. I want you to come to Pottsville.

The SECRETARY: It would not be worth while for us to go there because our effort to dry the town would be a hopeless task; I think it wouldn't avail anything.

MR. SCHULTZ: I want to renew the invitation that I extended to this body a year ago to come to Norristown. I think that Norristown is a very pretty place and I believe this body would be patriotic enough to avail themselves of the opportunity to see Valley Forge, the most prized spot to patriotic people of any place in the Union, and I extend to you a hearty invitation to come to Norristown and I will guarantee you a free ride in automobiles to go all over the great historic place of Valley Forge. I think that is what you all want to see. A great many of you people have not seen it yet and it is worth coming there to see. We have good hotel accommodations and, like Brother Stout said, we have other accommodations—we have a large jail and insane asylum there close at hand, though I hope we won't need that. I want to extend this invitation.

The SECRETARY: What is the matter with going to Somerset county? Our people would be very glad to have the meeting. I feel sure if you would unite with me, we will extend an invitation for them to come to Somerset county. I expect to be back on the farm then.

MR. LOHR: Mr. Chairman, I don't know that I am in position to extend an invitation to come to Somerset county this time, because I have not given the matter any consideration or thought; in fact, I want to go to Conneaut Lake, but I will be glad to have you come to Somerset at some future time.

MR. CAMPBELL: All we have at Conneaut Lake is good air, clear water and a good time.

It was moved and carried that the nominations close.

It was moved and carried that the Secretary call the roll and that each member vote as his name was reached.

The nomination of Somerset was withdrawn.

MR. ROUSE: I am the Erie county member and I would very much like this meeting to come up to Crawford county and I will just say to the members that while there they should go to Erie and see the northwestern corner of this State; it is well worth your while.

MR. WELD: I want to second the nomination of Conneaut Lake. I extended an invitation to meet with us in Warren county last year, but Brother Campbell and I came to a decision that we would not

pull against each other, so we have pulled off for the present and wish to throw our influence to Conneaut Lake.

The roll was then called and resulted in the following vote: For Conneaut Lake, 36; for Williamsport, 5; for Lock Haven, 3; for Norristown, 5.

MR. SCHULTZ: I move that we make that unanimous for Conneaut Lake.

The SECRETARY: I second the motion.

Motion adopted.

MR. HUTCHISON: I might say that I promised Mr. Kahler to vote for one of the most beautiful cities in the Commonwealth and that is Williamsport.

The CHAIRMAN: Our next topic is Poultry, and I take pleasure in introducing to you Mr. W. Theo. Wittman, Chairman, from Allentown. You know we can't get along without the Dutch.

MR. WITTMAN: It seems very appropriate that my report should follow that of the Committee on Livestock. It always warms a poultryman's heart to hear the sort of report we have just had, because as meat goes up people are bound to turn to poultry and poultry products. Again, we don't have the handicap that the livestock people have, because it is possible for everybody to have some chickens and some eggs, and we poultry people are just beginning to learn some rational way of taking care of poultry, and not only can we have poultry as a small proposition but we can have poultry as a large proposition, and it pleases me to-day to follow the report on livestock. My written report reads like this, and this paper is going to be very short, and please don't read anything between the lines except the statements just as I make them; I am not looking to lose any more hair than I have already lost.

Mr. Wittman then presented the following paper:

REPORT OF COMMITTEE ON POULTRY

By W. THEO. WITTMAN

Gentlemen: It would appear that some quite radical changes have occurred in the poultry situation in the State within the last twelve months. The most outstanding of these is the slump in the fancy poultry business. Of the some hundred and ten poultry associations in the State, something like one-third dropped their annual poultry show this year. And while it is difficult to arrive at exact figures, it is very likely that at least an equal per cent. or about one-third of the entire number of poultry people terming themselves "fanciers" have quit as such. Also those associations that did hold their annual shows found, with very few exceptions, it is even more difficult

than usual to come out on the right side of the balance sheet. This condition of affairs is due to several causes, the details of which would consume more time than is allowed this report. Summed up, and in its final analysis:

THE GENERAL PUBLIC IS MORE AND MORE INTERESTED IN POULTRY ONLY SO FAR AS IT WILL LAY EGGS AND GROW POUNDS OF MEAT AND ONLY A COMPARATIVELY SMALL NUMBER WISH TO KEEP AND BREED POULTRY AS A "FANCY."

The more progressive of the poultry associations have introduced monthly lectures and demonstrations and others have had them every afternoon and evening during show week and have found that they are well attended and a great deal of interest shown. As an example: At Pittsburgh Show last week with lectures every afternoon and evening the hall was crowded every session. The next big change in the poultry situation is as a result of the European war. This war has removed all fear that, with the tariff taken off eggs, our markets would be flooded with foreign eggs; for even after a few months of war the big European poultry growing nations, Belgium, France, England, Germany, etc., have practically wiped out their enormous poultry stocks and with the end of the war, Europe for a while at least, must be an importer of poultry and eggs instead of as formerly, as exporter.

Another change in our poultry situation is the rapidly growing acceptance of the fact that poultry, just like other farm animals, can be bred for production. In consequence, a big demand has sprung up for stock that has avowedly been bred to lay eggs. Pennsylvania breeders of this kind of poultry have found trade very brisk, and in some instances, at least, egg farmers carrying thousands of hens have already sold in advance every egg for hatching, their flocks can possibly lay this season.

Again, the poultry people of the State feel that at last perhaps they are in a situation, where they can introduce a bill before the Legislature creating a Bureau of Poultry Husbandry as part of the Department of Agriculture and carrying other features, with some hope of success. For the people of the State are hungry for reliable poultry information and reliable poultry service and having had a taste of it as provided by the Bureau of Farm Advisers and by the poultry associations, they want to have and will have more of it, and deserve to have it. Prices for poultry and eggs this last year have been good average for the year: Eggs, 31c per dozen; live poultry, 13c a lb.; dressed poultry, 18c per lb.

The Chairman: Is there any discussion on this topic?

MR. HUTCHISON: Are English Leghorns stronger than ours?

MR. WITTMAN: They are larger and stronger, and when it comes to laying, they simply run away from everything else. In the North American contest, the Barons, which are simply English Leghorns, have laid 201 eggs for 5 chickens in ten weeks. It would be very interesting to compare the best that the American Leghorns have laid in that same time, with that record, but it was way below that.

A Member: A good deal of the poultry advertised as being Baron strain is not Baron strain, it is just done to get a larger price for it.

MR. WITTMAN: May I say something else, that you want to be sure, when an American or Pennsylvanian says he has Baron strain, that he is taking care of that wonderful vitality the English have in their Leghorns. I know a man who paid a wonderful price for three chickens and a roosters and he has raised 100 cripples and is going to sell some eggs for hatching this spring from those miserable chickens, and you want to be sure, when you get this stock, that you get it from where it has been well taken care of, and not from devitalized stock.

The CHAIRMAN: Are there any further remarks? If there is no objection, this report will be received and filed. It is received. Our next topic is Forests and Forest Products, Miss Mira L. Dock, of Fayetteville, Pa. Is the lady present?

The SECRETARY: I have not heard anything from Miss Dock except that I found in my mail this morning a package of photographs that I think she intended to use in connection with her report if she had been here, but I have not heard from her otherwise.

The CHAIRMAN: Then we will take up the next topic at present, Feeding Stuffs, by our friend Mr. Hutchison.

MR. HUTCHISON: I was just going to say that we have Dr. Sparks here and I would just like, with the permission of the Board, if he would come forward and say a word just at this time, if it is your pleasure.

ADDRESS—DR. SPARKS

It is awfully good of you, Mr. Hutchison, and men and women of the Board. This meeting comes at an unfortunate time for me in some particulars, because it is held simultaneously with the meeting of the State College Trustees and they have long sessions, especially this year when we are looking forward toward the legislative appropriations. The Governor presided yesterday afternoon and you people will be interested, I think, knowing that in his opening address the burden of his remarks was how the College can be of more service to the farm producer in garnering his crop and in getting it to the market, and I think we are all to be congratulated on having a man who, himself, though in recent years a city man, nevertheless has not forgotten his early life in the country and who is making such an effort to study the rural problem and the problem of the rural resident in order to improve matters generally.

I think we all feel a little bit sad in this meeting to think that the Secretary who has presided—not presided, but acted as Secretary for so many years, is approaching what seems, from his side at least, to be the last meeting that he will be with us in his official

capacity. It has been my great pleasure to have him on the Board of Trustees of the Pennsylvania State College in the six years I have been connected with the School, and I should be false to every dictate of fairness and judgment if I did not say that, nothwithstanding the busy official life that he leads in the Department, he nevertheless, has found time to attend nearly every meeting of the Board of Trustees of the College, and those of you who have been to State College know that it is not an easy matter to reach there. We have a Penitentiary six miles away which I believe is more accessible than the State College. The journey up there and back consumes some little time, and yet the Secretary has always found time to be there and give us the benefit of his judgment in matters pertaining to the School of Agriculture and to the Agriculture Experiment Station, and, in fact, to the entire college, because he is such a broad minded man that he realizes the fact that the student of agriculture ought to come in contact with the student of other lines of work so as to give him a broad view and make him a man of the world; because on the farm he has had to come in contact with the commission merchant and with the shipping agent and all the various lines of work, not alone the cultivation of the soil, but other lines as well, including the fertilizer man.

Now I have no speech to make except simply to pay this little tribute to Secretary Critchfield and also to speak of the interest that Governor Brumbaugh is taking in our agricultural work, and to say that the State College and Experiment Station, so far as its agricultural interests are concerned, continue to stand in the hope of being useful in all possible manner to the agricultural interests of the State.

The Smith-Lever Bill, as just passed, has vast possibilities. It makes one tremble almost at times to think of what that administration will amount to in a few years, and if we can get that in the right channel, it will be the most beneficial to the taxpayers of Pennsylvania, and that is the last desideratum, that is the thing we all want to do, and with that and the present conditions altogether, it seems to me that the future of the agricultural interests in his State seems to be especially bright and promising and hopeful, if only we can find a way to the market, if only the ambitions of certain foreign rules—if only this intangible thing they call the balance of power, for which they are killing men and piling up an enormous national debt—and what does it amount to in the end? You and I believe that it is not worth the death of one soldier, the most ignorant, cheapest, meanest soldier that dies; it is not worth that, and we shall be fortunate of course if we can keep our neutrality and keep out of it, but we shall find our market hampered to a certain extent, and I, for one, cannot believe that it is a wise thing to try to starve out the enemy by bolting our own front door. We tried that one time, in President Jefferson's administration, in order to keep neutrality or try to avoid getting entangled in the Napoleonic Wars, to avoid feeding the enemy of one nation and offending another nation. We put an embargo on our vessels. Within one season the crops were piled up in the warehouses; business had become stagnant, and while trying to starve out the enemy, we were starving ourselves.

Down in the East Indies, when a man wants to avenge himself on his neighbor, he goes and commits suicide on his neighbor's doorstep; it is a delightful way; and I cannot help thinking that in order to starve out the enemy and preserve our neutrality, we have got to kill ourselves on our own doorsteps. I stand solidly against that proposition. I believe that the farmer who raises his crops has a right to get to the market, and the market, wherever it may be, is an open market. I did not expect to discuss this, if it is against the ethics of this Board to speak of political matters; I can only say that I am actuated by a matter of public concern which we have all got to face sooner or later. I thank you, Mr. President and Mr. Secretary.

MR. HUTCHISON: Mr. Chairman, the inquiry was made of me, a few moments ago, if I was sick. Well, I have some cold. The Secretary said I had been so still through this meeting that he wanted to know if I was sick. Well, it was just my luck to hear my brethren talking and then to be called away as I was yesterday, to attend this important meeting of the Board of Trustees of the College. The whole conversation and work of that meeting was in regard to aiding agriculture, helping agriculture. Though there are other interests at the college, yet the paramount question before that Board was agriculture, from the city man and from the country man. I remember—this is just aside and a little in line with the doctor's talk—when I went on the Board there was just Col. Woodward and a few good friends standing up for agriculture. They had broken the ice. There came a time the tide changed and everything is coming this way, and when you go home, get back of the appropriation for the college; we need more buildings, we can take 200 or 300 more boys next year in the freshman class, but we need more buildings, we need a place to house the boys and girls. There are 250 girls up there studying domestic science, and we need this help and it must come from the people, and we have a Governor that I have known from his youth and he is in tune, in touch and in sympathy with agriculture all over the State. He was raised in the poorest section of our State, up in the mountains. You have the same sections in other parts of the State, and he knows what it is to try to dig a living out of a poor farm and pay a mortgage for his father who unfortunately, through the panic, lost money. He knows what it is to sympathize with those of us who have to dig it out on the farm. He will get back of it, and let us all go as one man to get a good appropriation for this school we love, and in doing this we will turn out a corps of young men and young women over this fair State of ours that will cope with the battle of life. So much for that; that just came out because it's near my heart and I wanted to emphasize that part because I know how these gentlemen work.

Mr. Hutchison then presented the following report:

REPORT ON FEEDING STUFFS

By G. G. HUTCHISON

As your Specialist on feeding stuffs, I beg permission to make a report to this body concerning the condition of the feeds sold in Pennsylvania and the work done by the Department of Agriculture during the year just closed. It is well known to you all that there has been a marked advance in the price of the many feed products throughout the country since early last fall. This condition has caused an advance in the value of selling price of the various grades of commercial feeding stuffs offered for sale in our State. Because of this situation, therefore, there has been a temptation on the part of some feed manufacturers to discover and use some cheap by-products for use as ingredients in feeds, which perhaps has little feeding value, in order to take advantage of the rise in market value in feeds and also, if possible, to offer for sale feeds at less prices. We are glad to report, however, that the majority of manufacturers are complying with the requirements of the law and co-operating with the Department in its effort to keep the character of feeds sold in the State of good quality and properly labeled.

In order that you may know of the amount of work accomplished by the Department in enforcing the feeding stuffs law, it seems proper to include this information in this report. During the year 1914, special agents of the Department visited 327 towns and cities and 61 counties of the State and obtained 1,300 samples of the various brands of feeding stuffs found being offered for sale. All these these samples were sent to the Chemical Laboratory and analyzed chemically to see if the guarantees were properly given; and they were also examined with a microscope to find out if the ingredients claimed were really present in each case. Foreign or impure materials were also looked for and where such were found, in addition to the ingredients claimed, a report was made to the Secretary of these findings, together with the results of examination of all samples, and also included in the annual feed bulletin. A number of towns and cities were visited where samples were not taken, as it was found by the special agents that the feeds being offered for sale appeared to be properly labeled and guaranteed, and also because it was thought unnecessary to get too many samples of the same brand or class of feeds.

The character of the feeds, judged from the samples analyzed in the Laboratory, was good and the number of feeds found adulterated was less than formerly, which goes to show that the rigid enforcement of the feeding stuffs law has been of great value to the farmers and consumers of feeds in our State. The number of prosecutions necessary for misbranding or adulterated feeds gets less and less, each year. However it is still necessary to keep a watchful eye on all the various brands of feeds which are being sold, otherwise there is likely to be a number of brands of adulterated feeds sent into

our State. This work is especially necessary because there are 20 states, some of which have no feed laws at all, and some of which, while they do have laws, the ingredients of mixed feeds are not required to be placed on sacks or attached cards. As long as this condition exists there will be feeds sold in these states of inferior quality and we must be continually on the watch to make sure that they do not get into Pennsylvania. One such case occurred during the year where a molasses feed was shipped from a western state to one of our feed dealers which contained 25% of ground peanut hulls. The Chief Chemist of the Department, who has been appointed by the Federal Government as a Special Agent of Pennsylvania, was in a position to report this case to the Federal authorities who immediately got samples of this feed and took action against the manufacturers in the West and thus this form of misrepresentation was stopped so far as our State was concerned. We now have reason to believe that no such adulterated feeds are being sold in the State. As a matter of record, I will include with this report the list of towns and counties visited by our special agents and the number of samples taken in each, which I will not read, but which will be included in the proceedings:

COUNTIES VISITED AND NUMBER OF SAMPLES OF FEEDING STUFFS SECURED.

County.	Places.	No. of Samples.
Adams,	1—Littlestown,	7
	2—New Oxford,	11
	3—East Berlin,	1
	4—Gettysburg,	12
	5—Bendersville,	0
	6—Biglerville,	0
	7—McSherrystown,	0
	Total,	31
Allegheny,	1—Pitcairn,	1
	2—Pittsburgh,	22
	3—Carnegie,	5
	4—Wilkinsburg,	8
	5—Braddock,	8
	6—Aspinwall,	0
	7—Brackenridge,	0
	8—Bridgeville,	0
	9—Hays,	0
	10—Elizabeth,	0
	11—Homestead,	0
	12—McKeesport,	0
	13—North Braddock,	0
	14—Tarentum,	0
	15—Wilmerding,	0
	16—West Elizabeth,	0
	Total,	44
Armstrong,	1—Kittanning,	8
	2—Apollo,	2
	3—Leechburg,	6
	4—Ford City,	1
	5—Freeport,	0
	Total,	17

County.	Places.	No. of Samples.
Beaver,	1—Rochester,	6
	2—Beaver Falls,	7
	3—New Brighton,	4
	4—West Bridgewater,	2
	5—Ambridge,	0
	6—Beaver,	0
	7—Freedom,	0
	8—Monaca,	0
	Total,	19
Bedford,	1—Bedford,	9
	2—Everett,	1
	3—Saxton,	0
	Total,	10
Berks,	1—Reading,	26
	2—Kutztown,	7
	3—Fleetwood,	2
	4—Womelsdorf,	11
	5—Birdsboro,	0
	6—Mount Penn,	0
	7—Topton,	0
	Total,	46
Blair,	1—Altoona,	34
	2—Bellwood,	0
	3—Gaysport,	0
	4—Hollidaysburg,	0
	5—Juniata,	0
	6—Tyrone,	0
	Total,	34
Bradford,	1—Canton,	6
	2—Troy,	3
	3—Towanda,	14
	4—Athens,	0
	5—Sayre,	0
	6—Wyalusing,	0
	Total,	23
Bucks,	1—Quakertown,	11
	2—Doylestown,	12
	3—Chalfont,	0
	4—Newtown,	0
	5—Perkasie,	0
	6—Richlandtown,	0
	Total,	23
Butler,	1—Butler,	20
	2—Harmony,	0
	3—Mars,	0
	4—Evans City,	0
	Total,	20
Cambria,	1—Johnstown,	18
	2—South Fork,	8
	3—Ebensburg,	0
	4—Patton,	0
	5—Carrolltown,	0
	Total,	26

County.	Places.	No. of Samples.
Cameron,	1—Emporium,	8
	2—Driftwood,	0
	Total,	8
Carbon,	1—East Mauch Chunk, 2—Mauch Chunk,	4
	3—Lansford,	0
	4—Lehighton,	0
	Total,	4
Center,	1—Philipsburg,	7
	2—Howard,	4
	3—Bellefonte,	8
	4—Unionville,	0
	Total,	19
Chester,	1—Coatesville,	9
	2—Parkesburg,	5
	3—West Chester,	11
	4—Westgrove,	8
	5—Downingtown,	5
	6—Paoli,	10
	7—Atglen,	0
	8—Avondale,	0
	9—Kennett Square,	0
	10—Malvern,	0
	11—Phoenixville,	0
	12—Pocopson,	0
	Total,	48
Clarion,	1—Clarion,	7
	2—New Bethlehem,	0
	3—East Brady,	0
	Total,	7
Clearfield,	1—Munson,	2
	2—Wallaceton,	5
	3—DuBois,	8
	4—Coalport,	0
	5—Houtzdale,	0
	6—Osceola,	0
	Total,	15
Clinton,	1—Lock Haven,	13
	2—Millhall,	0
	3—Renovo,	0
	Total,	13
Crawford,	1—Titusville,	10
	2—Linesville,	11
	3—Conneaut Lake,	0
	4—Hydetown,	0
	5—Springboro,	0
	Total,	21

County.	Places.	No. of Samples.
Cumberland,	1—Mechanicsburg,	7
	2—Carlisle,	8
	3—Newville,	4
	4—Shippensburg,	8
	5—Lemoyne,	0
	6—Mount Holly Springs,	0
	Total,	27
Dauphin,	1—Harrisburg,	15
	2—Millersburg,	2
	3—Hummelstown,	4
	4—Highspire,	1
	5—Middletown,	0
	6—Penbrook,	0
	7—Steelton,	0
	Total,	22
Delaware,	1—Media,	12
	2—Morton,	0
	3—Swarthmore,	0
	Total,	12
Elk,	1—Ridgway,	8
	2—St. Marys,	8
	3—Johnsonburg,	0
	Total,	16
Erie,	1—Erie,	17
	2—Wesleyville,	7
	3—Belle Valley,	0
	4—Corry,	0
	5—Girard,	0
	6—Union City,	0
	Total,	24
Fayette,	1—Uniontown,	10
	2—Bellevernon,	0
	3—Brownsville,	0
	4—Connellsville,	0
	5—Dunbar,	0
	6—Fairchance,	0
	Total,	10
Franklin,	1—Chambersburg,	15
	2—Greencastle,	0
	3—Mercersburg,	0
	Total,	15
Greene,	1—Waynesburg,	3
	Total,	3
Huntingdon,	1—Mapleton,	6
	2—Huntingdon,	2
	3—Mount Union,	0
	4—Petersburg,	0
	Total,	8

County.	Places.	No. of Samples.
Indiana,	1—Indiana,	9
	2—Blairsville,	11
	3—Homer City,	4
	4—Blacklick,	0
	5—Clymer,	0
	6—Creekside,	0
	7—Saltsburg,	0
	Total,	24
Jefferson,	1—Reynoldsville,	5
	2—Brookville,	4
	3—Landsey,	5
	4—Punxsutawney,	8
	5—Big Run,	0
	6—Brockwayville,	0
	7—Falls Creek,	0
	8—Summerville,	0
	9—Sykesville,	0
	Total,	22
Juniata,	1—Mifflin,	6
	2—Port Royal,	2
	Total,	8
Lackawanna,	1—Scranton,	18
	2—Carbondale,	0
	3—Dunmore,	0
	Total,	18
Lancaster,	1—Lancaster,	21
	2—Elizabethtown,	12
	3—Quarryville,	6
	4—Gap,	6
	5—Christiana,	4
	6—Lititz,	6
	7—Manheim,	12
	8—Columbia,	0
	9—Ephrata,	0
	10—Mount Joy,	0
	11—New Holland,	0
	12—Strasburg,	0
	Total,	67
Lawrence,	1—New Wilmington, 2—Neshannock Falls,	5
	3—New Castie,	19
	4—Ellwood City,	0
	5—South New Castle,	0
	6—Mahoningtown,	0
	7—Wampum,	0
	Total,	24
Lebanon,	1—Palmyra,	16
	2—Lebanon,	2
	3—Cleona,	2
	4—Myerstown,	9
	5—Avon,	5
	6—Annville,	0
	7—Jonestown,	0
	Total,	34

County.	Places.	No. of Samples.
Lehigh,	1—Allentown,	19
	2—Bethlehem,	0
	3—Catasauqua,	0
	4—Emaus,	0
	5—South Allentown,	0
	Total,	19
Luzerne,	1—Wilkes-Barre,	30
	2—Luzerne,	9
	3—Nanticoke,	8
	4—Forty Fort,	0
	5—Kingston,	0
	6—Nescopeck,	0
	7—Pittston,	0
	8—Plymouth,	0
	9—Shickshinny,	0
	Total,	47
Lycoming,	1—Williamsport,	13
	2—Muncy,	7
	3—Antes Fort,	
	4—Jersey Shore,	
	5—Montgomery,	0
	6—South Williamsport,	0
	Total,	26
McKean,	1—Bradford,	18
	2—Smethport,	4
	3—Port Allegany,	4
	4—Kane,	14
	5—Eldred,	0
	6—Mount Jewett,	0
	Total,	40
Mercer,	1—Sharon,	9
	2—Farrell,	4
	3—Greenville,	0
	5—Jamestown,	0
	6—Mercer,	0
	7—Sharpsville,	0
	Total,	13
Mifflin,	1—Lewistown,	14
	2—McVeytown,	0
	3—Newton Hamilton,	0
	Total,	14
Monroe,	1—East Stroudsburg,	8
	2—Stroudsburg,	
	Total,	8
Montgomery,	1—Pottstown,	10
	2—Lansdale,	11
	3—Conshohocken,	66
	4—Norristown,	7
	5—Edge Hill,	6
	6—Ambler,	6
	7—Jenkintown,	0

County.	Places.	No. of Samples.
	8—Hatfield,	0
	9—North Wales,	0
	10—Royersford,	0
	11—West Conshohocken,	0
	12—Glenside,	0
	Total,	46
Northampton,	1—South Bethlehem,	6
	2—Easton,	12
	3—Bethlehem,	0
	4—Slatington,	0
	Total,	18
Northumberland,	1—Sunbury,	15
	2—Shamokin,	11
	3—Milton,	8
	4—Mount Carmel,	0
	5—Northumberland,	0
	6—Watsontown,	0
	Total,	34
Perry,	1—Millerstown,	2
	2—Marysville,	0
	3—Newport,	0
	Total,	2
Philadelphia,	1—Philadelphia,	2
	Total,	2
Potter,	1—Coudersport,	11
	2—Ulysses,	0
	Total,	11
Snyder,	1—Selinsgrove,	2
	2—Middleburg,	0
	Total,	2
Somerset,	1—Windber,	10
	2—Middleburg,	0
	Total,	10
Susquehanna,	1—Montrose,	11
	2—Hallstead,	0
	3—New Milford,	0
	4—Alford,	0
	Total,	11
Tioga,	1—Westfield,	10
	2—Wellsboro,	19
	3—Blossburg,	0
	4—Elkland,	0
	5—Knoxville,	0
	6—Lawrenceville,	0
	7—Osceola,	0
	8—Tioga,	0
	Total,	29

County.	Places.	No. of Samples.
Union,	1—Lewisburg,	6
	2—West Milton,	6
	3—Mifflinburg,	4
	Total,	16
Venango,	1—Oil City,	14
	2—Franklin,	5
	3—Emlenton,	0
	4—Rouseville,	0
	5—Siverly,	0
	Total,	19
Warren,	1—Warren,	8
	2—Youngsville,	3
	3—Columbus,	0
	4—Sheffield,	0
	Total,	11
Washington,	1—Washington,	13
	2—Huston,	8
	3—Charleroi,	8
	4—Monongahela,	9
	5—Donora,	3
	6—Canonsburg,	12
	7—South Canonsburg,	0
	8—Speers,	0
	9—West Brownsville,	0
	Total,	53
Wayne,	1—Honesdale,	11
	2—Hawley,	0
	Total,	11
Westmoreland,	1—Latrobe,	2
	2—Greensburg,	14
	3—Mount Pleasant,	3
	4—Irwin,	2
	5—New Stanton,	2
	6—Scottdale,	11
	1—New Kensington,	6
	8—Parnassus,	3
	9—Monessen,	4
	10—Jeannette,	4
	11—Bolivar,	0
	12—Derry,	0
	13—North Bellevernon,	0
	14—South Greensburg,	0
	15—Trafford,	0
	16—Manor,	0
	17—Vandergrift,	0
	Total,	51
Wyoming,	1—Meshoppen,	9
	2—Mehoopany,	0
	3—Tunkhannock,	0
	Total,	9

County.	Places.	No. of Samples.
York,	1—York,	24
	2—Hanover,	15
	3—Dillsburg,	0
	4—Glen Rock,	0
	Total,	39
	Grand total,	1303

It will be of interest to you gentlemen to learn some of the problems with which the Department has been confronted during the past year. In former reports I took up the subject of the analysis and composition of the various feeds being sold on our markets. This information has been from time to time, also published in our annual bulletin, therefore, I will not take up your time by again going over this subject in detail. This information can be obtained by getting the last Feeding Stuffs Bulletin No. 249. In watching out for foreign materials which might be used as ingredients in mixed feeds, the chemists identified a by-product, which was in the form of a light colored finely ground substance, as being vegetable ivory. It was discovered that this product was the ground residues or borings and cuttings from the manufacture of buttons from the ivory nut. This nut resembles true ivory in its color and texture hence its name, and it grows on a specie of palm tree in South America. This ground up button borings, from what we could learn, is likely to be put into mixed feeds and sold in states where they do not have a rigid enforcement of the feeding stuffs law. It has no feeding value whatever, and as a result of our finding out the character of this material, we are now prepared to identify it if it is ever used as an ingredient in feeds sold in our State.

Another product that certain dealers tried to sell in our State as an ingredient in mixed feeds is a substance known as "Peat" and which in some cases is called "Humus." This material is dug out of the bogs and lowlands of the West. Feeding value is claimed for it when used or mixed with molasses in these kind of feeds. As a result of the investigation and study of this material, the Department has refused to register feeds containing it or to permit its sale in the State for the reason that as it contained approximately 13% of insoluble matter. It was not believed to have any feeding value.

Another problem to which considerable attention has been given is in keeping whole weed seeds out of chicken feeds, as required by the law. The character of chicken feeds sold in the State is getting better and better each year; however, there has been a few brands found which contains them. And in several cases it was found necessary to take action against the parties handling them. As a result of this work, and after a conference with the officials of one company, it was finally agreed by this company to keep whole weed seeds out of their chicken feeds which were being sold in the State without causing a lengthy court trial to be held to settle the contention of the Department. The promise of this concern, as well as of others who sell chicken feeds to comply with the requirements of the law, will tend to make this class of feeds better than ever before. It will also not be necessary for the department to analyze so many samples

of this brand and be continually on the watch for this form of violation. One class of feeds with which we had considerable trouble early in the enforcement of the law, was the so-called molasses feeds. A few years ago these feeds contained large amounts of whole weed seeds and other adulterants, but at the present time this class of feeds sold in our State are practically free from whole weed seeds. The various kinds of grain screenings that are usually used in the manufacture of molasses dairy feeds, and which contain varying amounts of cereal grains and weed seeds, are now being finely ground, pulverized and in some cases bolted before they are used. The usual name given in labeling this class of feeds, which contain this product, is ground screenings meal. The process of grinding the screenings to a fine meal, destroys the germ and thus prevents germination. Screenings meal will analyze from 15% to 17% of protein, and therefore contains considerable feeding value.

For the information of purchasers of this class of feeds, the law requires that the ingredients be named on the sacks or attached cards, so that when these feeds are offered for sale, their composition as well as the analysis can be found out by reading the information printed on the sacks or cards. We have had a little trouble with the method of guaranteeing cottonseed meal" In some cases this feed was found to contain excessive amount of cottonseed hulls, but the number of meals containing hulls which are sold are becoming less. Purchasers of cottonseed meal should pay attention to the guarantees given which are often misleading because of the so called sliding guarantee, as for example,—38.62% to 43.00% or more percentage of protein. Where such guarantees are given, the higher figures are not often met and, therefore, it is recommended that in buying this product you should base the sale on the lower guarantee, as this figure will usually be met without any trouble. The Association of Feed Control Officials, as well as our department, is investigating the method of guaranteeing cottonseed meals. The Chief Chemist inspected a number of cottonseed meal plants in the South in an attempt to get some information on this subject, and it was found that in the majority of cases the protein content could be controlled and the guarantee given maintained. The result of this inspection will, undoubtedly, help to make uniform the guaranteeing of cottonseed meal and it is hoped the manufacturers can be persuaded to give only one guarantee for this product and thus prevent confusion and misrepresentation where the sliding guarantees are given, as is the case in many brands now being sold.

Registrations for practically every brand of feed sold during 1914 was received by the Department. The total number of registrations received was, approximately, 625, representing 2,300 different brands. In a number of cases in these registrations, when received, where the method of giving the ingredients, or where it was thought that the feeds were not free from weed seeds or other materials, samples were asked for from the companies and carefully examined. In a number of cases registration was refused for certain brands which contained by-products prohibited by our law. In other cases they were sent back for correction, with directions for stating the true guarantees and compositions. We have had a number of requests for the digestible or true feeding value of a number of mixed feeds, and in

some cases, this information can be given. In the majority of cases, however, digestion experiments have not been made on many of the by-products used in mixed feeds and, therefore, in such cases where this information is not known, and where the amount of each ingredient used in a mixed feed, and the analysis of same, is not known, this information cannot be accurately given. A number of digestion experiments are being made, however, on many of the by-products used for mixing feeds by our Experiment Station and in other states. It is hoped that in the near future the results of this investigation will be in such shape that the true feeding value of most of the feeds can be estimated more accurately than can now be done.

You, no doubt, are aware that we can analyze samples of feeds for any of you gentlemen where it is suspected the guarantees are not met. We are ready and willing to at all times give you all the information on the subject of feeds which we possibly can. If any feeds which you gentlemen buy does not look good, send a sample to the Department for examination. We want your hearty cooperation in this work, so therefore, do not hesitate, at any time to call on us for information.

Before closing, I desire to call your attention to another problem with which the Department is confronted. Samples are sent to the Department Laboratory, from time to time, which are suspected of causing illness to stock; and in these cases it is seldom found that the trouble was due to the feed. If any of you gentlemen have any cause to suspect illness or death from feeding any brand of feed, you should get a veterinarian to make an examination of the stock, as in many cases, it has been found that the trouble is caused by some form of illness rather than to the feed being used.

The CHAIRMAN: I want to compliment the gentleman on his able report; it is a very good paper, indeed, and I know it requires a great deal to accomplish the work that he is after.

MR. DAWSON: I would like to ask Mr. Hutchison a question? Does the law compel the manufacturer of feeds to put the analysis on the sack?

MR. HUTCHISON: Either on the sack or on a card attached to the sack.

MR. DAWSON: The reason I asked the question is that I was in the mill and there was a gentleman there, who was with me, not long ago, where the miller was selling a feed and there was no mark whatever.

MR. HUTCHISON: Maybe it was from whole grain; if you have it from whole grain corn, oats and buckwheat, the miller would not have to mark it.

MR. DAWSON: It was corn bran.

MR. HUTCHISON: Well, corn bran is a concentrated feed.

MR. DAWSON: Ought not there to have been something on it?

MR. HUTCHISON: Certainly; he should have an analysis on the sack or attached to the sack with cards printed; if it is loose in a bin,

he should have the analysis posted up on the side of the bin so that the customer can read it, and then when the customer gets it, he must furnish the customer with a copy of the analysis. Give me the name of that man and we will have it corrected.

The CHAIRMAN: Are there any other questions?

MR. BLYHOLDER: Does the law allow the selling of moulded and soured corn as good corn?

MR. HUTCHISON: A man dare not sell corn that is damaged, anything that is injurious to the health of domestic animals, he cannot sell for feed. I think that under any law a man is prohibited almost from selling bad corn. We have a sulfured oats question up—oats that had been bad and run through a process and sold in our State, and we brought a prosecution and convicted the man of selling bad oats.

The CHAIRMAN: Is there any further discussion of this topic? If not, if there is no objection, this report will be received and filed with the other papers.

The SECRETARY: Just at this time I would like to say that there is a possibility that some member has come in since the last roll call, and if there be any body here who knows that he has not answered to the roll call, either the first or second, I shall be very glad to have him give his name to the Assistant Secretary. We want to give everybody credit for being here and when we come to send you your voucher, we want to be sure that every man who is entitled to his expenses will get a voucher.

MR. BECK: I came in since the roll was called.

The SECRETARY: We are very anxious to get this matter correct. I believe it would be better and more satisfactory if the roll were called again and when there is no answer if someone present knows that the person whose name was called was here or has been here during the sessions, he will simply speak out and say he has been here.

ASST. SECRETARY WELD: I will call those who have not answered. J. H. Stevens.

MR. STEVENS: Here.

ASST. SECRETARY WELD: C. L. Hood; Walter Dunlap; William H. Milliron; R. P. Heilman; Abram Bosler; E. S. Keiper—

MR. KEIPER: Here.

ASST. SECRETARY WELD: C. E. Lantz; H. C. Snavely—

MR. HUTCHISON: Mr. Snavely is sick.

ASST. SECRETARY WELD: David Rust; Frank A Davies. That is all, worthy Secretary, that have not answered.

The SECRETARY: I believe that the people who are in session below would like to be here when Dr. Thorne is talking. That is the

next item on the program, and I would be very glad, Mr. Kahler, if you would go down and let someone in the room below know that Dr. Thorne will begin in about five minutes, and I think we had better declare a recess for about five minutes; we have had a pretty strenuous session.

The CHAIRMAN: A recess of five minutes is declared.

(Recess).

The CHAIRMAN: Gentlemen, we have a very important topic, "Lime and Commercial Fertilizers in the Maintenance of Soil Fertility," by Dr. C. E. Thorne, Director of the Ohio Experiment Station, Wooster, Ohio. I take pleasure in introducing to you Dr. Thorne.

The SECRETARY: And during the time that Dr. Thorne has the floor, won't you please be just as quiet as possible. He has come a long way to talk to us; let us give him a very good hearing.

ADDRESS OF DR. THORNE

It is always a pleasure to me to meet the Pennsylvania farmers, and especially to meet this Pennsylvania State Board of Agriculture, who have shown their interest in the practical work of the farm in so many ways. Your conditions over a large part of your State are quite different from those in Ohio, and yet you have in northwestern Pennsylvania, conditions very similar to those we have in northeastern Ohio. The results that we have attained, therefore, in our northeastern Ohio location, on the soil selected there are of considerable value to the farmers of northwestern Pennsylvania. Our conditions do not so nearly represent those of eastern Pennsylvania where you have more limestone in your soil than we have in eastern Ohio, but our station has been allowed to adopt the policy of extending its work over all the typical soils of the State or over the principal typical soils of the State, through the means of test farms or county experiment farms located in different parts of the State. We have been able, therefore, through this medium, to reach some of the larger types of soils in our State as well as the one on which the Experiment Station itself is located, and it is by this means that we have been able to check up and tally the work done at the central station in such a way as to many times modify our judgment and cause us to go slow in announcing results. And on the other hand, to feel the more sure in some cases that the results attained are of general application.

It seems very much like carrying coals to Newcastle to come into Pennsylvania and talk about liming the land, for our traditions respecting the use of lime on the land came into Ohio, carried by the Pennsylvania farmer when he came across and settled in our State; but 25 years ago the use of lime on the land was practically unknown in Ohio. A few farmers had, in a desultory way, made some experi-

ments, but Ohio settlement began a long time after that of Pennsylvania and the Pennsylvania German, when he came into eastern Ohio, left an old soil, one that had been in cultivation for a century and came on to a new soil lying in the forest, and he found that on this new soil the conditions were such that the treatment required was very different from that of the soils he had left, and, therefore, his ideas respecting the use of lime were modified and that use gradually disappeared from the State, so that I don't suppose that 100 tons of lime had been used in the last 10 or 15 years of the period ending 25 years ago.

So thoroughly had we become possessed with the idea that the soil, that all ordinary soils possessed sufficient lime for all purposes, that in planning the experiment with fertilizers and manures at the Experiment Station 22 years ago, we did not think it worth while to make any provision for testing the effect of lime and left it entirely out of our calculations. We had been allowed, after having spent 10 years in learning how to experiment on the location at Columbus, we had been allowed to move the station to a new location, to select a land that seemed to us, from our past experience, especially adapted to the purposes of field experiments, and we there laid out a series of experiments in the use of fertilizers and manures in the hope of learning how to better maintain the fertility of a fairly fertile soil, how better to recover the fertility of wasted soil, for it had been possible for our farmers, in the brief period they had occupied this land to tremendously waste its natural stores of fertility. The farm we selected for our purposes—and we made the selection because we had been criticized for work done on a more fertile soil on the score that work done on that soil at Columbus was not a sufficient guide to the farmer who was living on the poorer soils of the State, therefore we took the pains to select a soil that had been robbed of its fertility by previous management, and we succeeded in securing a farm that had been entered about 90 years ago by a Pennsylvania German family and subjected to the thorough husbandry which the Pennsylvania Germans knows so well how to exercise for some fifty years, during which time an excellent stone house had been built and a large barn and other improvements made showing that the land had been a fertile soil in the beginning. At the end of that period it was sold and purchased as an investment and for 25 years after that it was rented, and when it came into our possession, it showed every evidence of having been despoiled of its fertility; an old meadow upon which we located some of these experiments had been in timothy for several years until nothing was left gradually but five fingers and a few scattering weeds. The wheat stubbles on other portions of the farm were thin, showing a light growth of wheat. We started there and experimented in the growth of corn, wheat, oats and timothy in five year rotations, giving five tracts of land to this work in order to grow every crop each season, and we started with the use of both fertilizers and manure, using different combinations of fertilizers and different applications of common open barnyard manure, a system of economy practiced by the farmers of Ohio at that time.

Dr. Thorne then read the following paper:

LIME AND COMMERCIAL FERTILIZERS IN THE MAINTENANCE OF SOIL FERTILITY.

By DR. C. E. THORNE, *Wooster, Ohio.*

In 1893 the Ohio Experiment Station began a series of experiments in the use of fertilizers and manure on a tract of thin, sandy clay, lying over shaly sandstones from which it had been largely derived, and which had been brought to a very low state of production by three quarters of a century of exhaustive husbandry.

In one of these experiments, corn, oats and wheat are grown in succession, one year each, followed by two years in clover and timothy mixed, making a 5-year rotation. Five tracts of land of three acres each are devoted to this test, each crop being grown every season. The tracts are divided into plots containing one-tenth acre each, and different combination of fertilizers or manure are applied to the grain crops, the clover and timothy being left untreated. Every third plot has been left untreated since the beginning of the experiment.

In planning this experiment no provision was made for the use of lime. At that time the work of field experimentation was in its infancy. The Rothamsted experiments in England had, it is true, been in progress for some forty years, and the experiments at Pennsylvania State College for ten years, but in neither of these tests was there any evidence that lime was needed, and the assumption seemed to be warranted that the supply of lime, like that of iron, sulphur and several other necessary elements of plant food, might safely be left to take care of itself.

But very soon it was observed that the clover crop was misbehaving, the harvest which should have been chiefly clover, consisting mainly of timothy, with sorrel and other weeds. The difficulty was at first ascribed to spring frost having destroyed the young clover plants, and we attempted to remedy it by making two sowings. One spring we sowed three times, and assured ourselves that we had a good stand by careful inspection, and yet when the harvest came the clover was not there. We accused the fertilizers of contributing to the trouble by their failure to add to the organic matter of the soil as does manure; but we found that even on the manured land the clover was not a good crop, although much better than on some of the land where fertilizers were used, or on that left untreated. Every year there would be spots of fair clover, which would be larger when rain was abundant and smaller in seasons of drought, but there was never a satisfactory stand, no matter how well the land was fertilized or manured.

In 1900 we decided to try the effect of lime, and began by spreading quicklime at the rate of a ton per acre over the west halves of all the plots, fertilized and unfertilized alike, the plots being 16 feet wide by 16½ rods long and running east and west. The lime was applied to the land as it was being prepared for corn and was stirred

into the surface with harrow and cultivator. The corn was harvested separately, but showed but little effect from the liming, and the oats and wheat crops following showed so little effect that the limed and unlimed halves were not separately harvested; but when the clover crop came around the effect of the liming was unmistakable.

Some of the results of this work are shown in the table, which gives the average unfertilized yield for all the land and the average increase from a few of the treatments for 13 crops of corn, 11 of oats, 9 of wheat, 12 of clover and 8 of timothy which have been separately harvested on the limed and unlimed land since the beginning of the liming.

FERTILIZERS AND LIME ON CROPS GROWN IN ROTATION.

Treatment	Corn, bus.	Oats, bus.	Wheat, bus.	Clover, lbs.	Timothy, lbs.
Untreated yield per acre,	24.9	27.3	13.2	1,348	2,459
Treated: Increase per acre					
Lime alone,	8.5	3.5	2.1	539	641
Phosphorus alone,	9.8	10.6	8.0	452	391
Phosphorus and lime,	17.6	14.3	10.9	1,233	1,242
Phosphorus and potassium,	17.7	15.5	8.7	880	707
Phosphorus, potassium and lime,	26.0	19.1	11.4	1,963	1,569
Phosphorus, potassium and nitrogen[1],	22.6	21.0	11.6	812	654
Phosphorus, potassium, nitrogen and lime,	33.1	22.7	15.4	2,118	1,972
Yard manure[2],	31.0	15.1	16.2	2,187	2,273
Yard manure and lime,	38.1	16.9	19.0	3,215	3,371
Lime over fertilizers,	8.4	2.7	3.0	1,049	1,037

[1]Nitrogen in dried blood.
[2]Manure is applied only to corn and wheat. The chemical fertilizers are applied to corn, oats and wheat.

VALUE OF INCREASE, COST OF TREATMENT AND GAIN PER ACRE.

	Value of Increase[3]	Cost of treatment[4]	Net Gain	Gain for lime
Lime alone,	$13 41	$5 00	$8 41	$8 41
Phosphorus alone,	20 64	2 50	18 14	.....
Phosphorus and lime,	36 84	7 50	29 34	11 20
Phosphorus and potassium,	20 65	9 00	21 65	.....
Phosphorus, potassium and nitrogen,	48 42	14 00	34 42	12 77
Phosphorus, potassium and nitrogen,	37 23	17 45	19 78	.....
Phosphorus, potassium, nitrogen and lime,	59 97	22 45	37 52	17 74
Yard manure,	58 91	432 00	26 91	.....
Yard manure and lime,	76 62	37 00	39 62	12 71

[3]Computing corn at half a dollar per bushel, oats at one-third of a dollar, wheat at one dollar and hay at ten dollars per ton.
[4]Counting manure at two dollars per ton.

The table shows that the lime alone has materially increased the yield on the unfertilized land, the gain from lime alone being nearly as great as that from phosphorus alone in the corn crop and considerably greater in the hay crops.

When the liming has supplemented the use of fertilizers and manure, it has maintained in the grain crops practically the same additional increase over that produced by the fertilizers that it has given on the unfertilized land, while in the clover and timothy the liming has produced nearly twice the increase on the fertilized or manured land that it has on the unfertilized land. This point has been very conspicuous as the clover has been inspected in the field each season. It has been plainly evident that lime alone is not sufficient to maintain a full growth of clover on a soil so depleted of other elements of fertility as the one under this experiment.

Next to the hay crops, the corn has profited most from the liming, as shown by the last line of the table, and this is what would be expected on the basis of the composition of the crops, for while a crop of clover contains ten times as much lime as an equivalent crop of wheat, it contains only about $4\frac{1}{2}$ times as much as an equivalent crop of corn.

However, the lime content of the oats crop is twice as great as that of wheat, and timothy contains about one-sixth the lime found in clover, so that the composition of the crop does not fully explain its requirement of lime.

On the other hand, when we study the conditions necessary to the maintenance of the work of the micro-organisms of the soil by which the soil nitrogen is converted into forms available to the crops we cultivate, we can easily understand why clover should be first and corn next in profiting by the use of lime. For unquestionably the chief function of lime in the soil is not the direct feeding of the crops we cultivate, but the support of the nitrogen-gathering and nitrifying bacteria, by combining with the nitric acid which it is their province to produce and holding it in a form at once harmless to its producers and suitable for absorption by the growing crop. When the lime supply of the soil is deficient the nitric acid accumulates until it becomes toxic to the organisms producing it, the soil itself becomes acid, and the fixation of nitrogen ceases or is materially reduced.

An acre of corn or of clover contains twice as much nitrogen as an equivalent acre of wheat. Corn is able to secure this large quantity of nitrogen because it grows during the summer months when the nitrifying organisms of the soil are most active, and because the cultivation of the corn assists these organisms in their work by admitting air to the soil, while clover gathers its nitrogen through the aid of the bacteria inhabiting the nodules on its roots. To both classes of organisms an acid soil is unfavorable, and the statistics of crop production in Ohio show that the yield of corn is several bushels per acre lower in the sections where such soils prevail than in the regions where the soil is underlaid with limestone.

Wheat, however, is comparatively indifferent to soil acidity. The largest wheat yields in Ohio are found over the sandstones and shales of the northeastern counties, where the soil is generally acid, a fact which is chiefly due to the larger use of fertilizers in these counties.

The lime was first used in these experiments at the rate of a ton of quicklime per acre, but during recent years finely ground raw limestone has been substituted for the quicklime. Limestone is a combination of calcium or more commonly of calcium and magnesium with carbon and oxygen. When the limestone is burnt its carbon combines with part of the oxygen and goes off as carbon dioxide, the carbonic acid gas of the older chemistry. This combination constitutes nearly half the weight of the original stone, so that it requires approximately two tons of limestone to carry the amount of calcium and magnesium found in one ton of burnt lime; and since it is impossible to grind the stone to as fine a powder as that produced by burning and slaking we should use at least two tons of powdered stone as the equivalent of one ton of burnt lime.

In slaking, lime absorbs about one-third its weight of water, so that it requires a ton and a third of hydrated lime to carry as much calcium as is found in one ton of burnt lime.

When exposed for a long time to the air carbon dioxide is absorbed, and the lime reverts to its original condition of carbonate of lime.

Lime is not required by all soils, and when used in excess may cause loss instead of gain. This is shown by the experiments at Pennsylvania State College, the soil of which overlies limestone, in which two tons of burnt lime applied every 4 years, in a rotation of corn, oats, wheat and clover, has caused a reduction, instead of an increase, in yield, except when used in connection with yard manure, when the yield was somewhat greater than from the same quantity of manure used in the absence of lime.

One of the effects of lime is to cause a rapid decomposition of the organic matter in the soil by fostering bacterial action, and when the lime is not supplemented by manuring or by such use of other fertilizing materials as will favor a larger growth of crops, and therefore of crop roots, the stock of organic matter may be so depleted as to reduce the yield of the land. Where ground limestone was used instead of burnt lime, in the Pennsylvania experiments, there was a small increase in yield.

In pot tests at the Ohio Station, made on a very acid soil, the yield fell off when burnt lime was applied in excess of seven tons per acre, although ground limestone was used up to twenty-five tons per acre without any sign of injury.

These results show the fnndamental importance of lime in the maintenance of fertility, because of its great effect on the clover crop; but also show that lime cannot take the place of other fertilizing elements, but can only perform its full service when associated with phosphorus, potassium and nitrogen, all three; no one of the four can be omitted in the treatment of a soil which has been depleted of its fertility of such exhaustive husbandry as had the one under this experiment.

It does not follow, however, that it is necessary to add lime to all soils. Attention has already been called to the small effect of lime on the soil overlying limestones at Pennsylvania State College. The Ohio Station has a test farm in western Ohio, where the underlying rocks and limestones, and where experiments with fertilizers, manure and lime have been in progress for eleven years. In these experiments, fertilizers carrying phosphorus, potassium and nitrogen are

producing practically the same effect that has followed the use of similar fertilizers at the main station, but the increase from lime is comparatively insignificant.

The CHAIRMAN: Does anyone desire to ask Dr. Thorne any questions?

A Member: I would like to ask whether magnesian dolomitic lime is as valuable for agricultural purposes as 95 to 97 calcium?

DR. THORNE: We count it a little more valuable. The magnesian lime is not quite as readily soluble as the calcium lime. It will act a little slower unless you put on a sufficiency at first. You should be more careful to have it finely ground than if you used the common calcium, but its effect in neutralizing acidity will be a little greater than that of the common calcium and there is no danger of burning in the raw stone.

A Member: Suppose the lime contained considerable cement; is that injurious?

DR. THORNE: Well, we do not find—they use dolomitic stone, I believe for making cement, but we have not found anything of that kind that would be a matter to look out for at all.

A Member: If it is mixed in proportion to make the right kind of cement, I would like to know whether that same mixture would answer for agricultural purposes?

DR. THORNE: Oh yes, if it is finely ground it would be all right.

A Member: You advised the spreading of lime on freshly ploughed ground; would you advise it where the seasons are short? Would you advise it in the fall, for instance October, and what would be the result?

DR. THORNE: We like to keep it as near the surface as we can.

A Member: Suppose it is applied in the fall and ploughed in the spring?

DR. THORNE: If you apply it in October and plough it under in the spring, you are burying it deeper than we think ought to be done. We are not sure that the dissolution of the lime is the most important thing; we think if we can get a particle of undissolved limestone in contact with a particle of soil, that is what we are after, so we don't depend on the lime dissolving and seeping down in the soil like a fertilizer. The fertilizer will seep down; you can put it on the soil and it will seep down through it, but we don't like to plough the lime under, the bacterial organisms for whose benefit chiefly we are using the lime, are vegetables that grow where the soil is constantly moist, where the light is excluded but where air is admitted. Now if you bury the lime below the circulation of air, you are not going to get any result from it; you want to keep it in that layer of soil which is between the second and fourth inches; there is where most of the seed buds where air is circulating, where

light is excluded, where there is constant moisture, and to do this, if you plough it under, you lose it for the time being, so we think it is better to keep it as near the surface as you can; that is, by applying it to the surface and cultivating it in, but we do not advise—a great many farmers wrote last fall that the lime came too late to put on their wheat crop and they wanted to know if they should put it on the surface—we do not advise that, we advise them to put it on by the time the next crop is done coming.

A Member: You made a reference to wood ashes; how much lime is there in the ordinary heap of wood ashes and how much potash?

DR. THORNE: In unleached wood ashes, 30 per cent. lime and 5 per cent. or 6 per cent. potash and 1 per cent. phosphoric acid.

A Member: When the lime is applied in the fall under the sod, as the gentleman asked back here, will it act on vegetable matter in place of the soil?

DR. THORNE: You mean when it is ploughed under?

A Member: Leave it lay all winter.

DR. THORNE: Not seriously at all in that length of time; we do not think that there would be any serious effect from that. But the reason why we delay the liming is in order to get it mixed into the soil more thoroughly near the surface.

A Member: Another question; in this country, in fall seed wheat, applying lime and manure both to the surface, would that be a proper way to apply the two?

DR. THORNE: If the lime is applied first, there can't be very much loss. In that case we would advise applying the lime and stirring it in and then applying the manure, but would not advise putting the manure on and applying the lime on top of that, but in either case we would prefer to apply the lime first and sink it in and then apply the manure as a top dressing after that.

A Member: I had reference to caustic burnt lime.

DR. THORNE: In that case we would put the lime on first, decidedly.

A Member: I would like to ask how much time it takes the caustic lime to change to carbon after it is put on the soil?

DR. THORNE: Several weeks, we don't know exactly, but it is a matter of a few weeks, perhaps two or three months.

A Member: Can you tell anything about this marl that was shipped into this State from New York State?

DR. THORNE: There are two kinds of marl. The marl which comes from New York is probably marl from under peat beds and it is a deposit of lime that has been formed there through the living and dying of small shell bearing animals, such as snails and so

forth, until great deposits have been formed, and some of it is nearly pure carbonate of lime, that is, common limestone is a carbonate of lime and this is a nearly pure carbonate of lime. By the way, they are trying to sell carbonate of lime in our State for $8 or $10 a ton and it is nothing at all chemically but limestone. Now there is another marl down in Virginia; there is a great spring that has been flowing there for ages and a mist rises all the time from that spring and that mist has settled on the rocks and moss around it and there's millions of tons of marl as they call it that has accumulated there deposited out of this water like it is deposited from your teakettles every day where you are using hard water. That marl is a very pure carbonate of lime.

A Member: Have you detected a little insect that is destroying clover in your State?

DR. THORNE: We have just ploughed under a field of clover because there was an infestation of that insect. We wanted it to stand all winter and gather that plant food if it could, but it was so full of that insect that we turned it under immediately after taking off the second crop of clover.

A Member: I brought some of those insects along with me.

A Member: With phosphoric acid mixed with this lime and wood ashes, would there be any injurious effect?

DR. THORNE: No, no injurious effect with phosphoric acid. You should not mix nitrate of soda with it, but the phosphoric acid will not suffer any harm.

MR. WOODWARD: We have listened to a concise, clear cut statement on the subject of lime, the result of half a lifetime, half a working lifetime, spent in digging out the facts by one of the most distinguished scientists of the day, the value of which is greater than the cost of all the work of this Board of Agriculture and the Department combined in any one year, to the farmers of Pennsylvania. I move you, sir, that we express our appreciation of that work by a rising vote of thanks.

The motion was seconded and adopted by a rising vote.

The CHAIRMAN: I understand, gentlemen, that the Master of the State Grange is present and I know that you will all be glad to hear him for a few moments.

MR. JOHN McSPARREN: Mr. Chairman and gentlemen of the State Board of Agriculture: There has been a feeling for a long time that in our agricultural work in the State of Pennsylvania, there is too much overlapping of functions and that something would have to be done sooner or later to correlate the several activities of our Agricultural Department and remove, as far as possible, those interlapping functions; and so, several weeks ago, the several agricultural associations of the State, through the committee, got together, and they have worked on this problem and have worked out a bill to try and make those necessary corrections. They have finished that bill and presented it to the Governor and gotten his ap-

proval, and we thought that this was a good place, before it went to the papers, that it would be, because of the fact that this is a representative band of farmers from all over the State, that it would be a good place to bring this bill and read it to you, and so therefore, with your consent, I will read you the bill that we have prepared for presentation to this legislature.

MR. STOUT: Is that Commission to be appointed or elected?

MR. McSPARREN: The Commission is to be appointed by the Governor.

A Member: I would like to inquire why the Forestry Commission is not included?

MR. McSPARREN: Well, I think the reason for that was that the forestry more naturally falls under another proposition, there is a sort of a natural division here; this bill refers simply to those things that have to do with the cultivated land. When it comes to the forestry, to the game and fish and water conservation and all that, you are in another subject. This refers simply to the handling of the cultivated land and the powers that refer to that part of it, and we felt for that reason that possibly it was better at this time to leave the forestry out and then, if seen fit in the future, to bring it in, which can easily be done by an amendment.

MR. JOEL A. HERR: Where does this bill emanate from?

MR. McSPARREN: I said in the beginning that it emanates from a Committee of the Breeders' Association, the Horticultural Association, the Dairy Association, the Agricultural Committee of the Railroads, and the Agricultural Committee of the Bankers' Association, the Pennsylvania State Grange and the Agricultural Press.

MR. JOEL A. HERR: And the Board of Agriculture was not recognized in that at all?

MR. McSPARREN: No, I think not.

MR. STOUT: Does this law repeal the Act creating the State Board of Agriculture?

MR. McSPARREN: It does not.

A Member: I would like to ask where the farmer comes in in that bill, where he is given any consideration? It looks to me, speaking as a farmer, from the viewpoint of the farmer, which I am, and as a member of the Grange, that the preparation of that bill is a little bit one sided, from the fact that the press, the railroads, the bankers and things of that kind are receiving more consideration in that bill than the farmers of the State of Pennsylvania.

A Member: I would like to ask the gentleman what Committee of the Livestock Breeders' Association acted in this matter?

MR. McSPARREN: What were the three members from the Livestock Exchange?

A Member: By authority.

MR. McSPARREN: Oh, I guess I have given a wrong impression here. I think now I understand what is meant by some of these questions. I couldn't understand the brother's question over here. Did I give you the impression that this was an authoritative action of all these several Associations and that these Committees were appointed by the Associations? If I did, why that was a wrong impression to give you. This is a self-constituted committee, absolutely so, of 21 men; a self-constituted committee that got up this bill; it hasn't back of it the action of a single association.

MR. JOEL A. HERR: That is why I wanted to know where it emanated from.

MR. McSPARREN: I guess I gave you the wrong impression a while ago.

A Member: You surely did.

A Member: They ought to be ashamed of their work.

MR. McSPARREN: I don't know whether I can name the whole 21 just off the bat, or not. The Grange was represented by Mr. Creasey, Mr. Kester and myself; from the Breeders' Association was Mr. Bayard and Mr. Ronk. I don't believe I can give them all.

A Member: As this is an important subject and the hour is late, couldn't we take the matter up to-morrow morning?

The CHAIRMAN: Let us have your attention just for a few moments, gentlemen.

MR. McSPARREN: Just a minute, please, I would like to read you these 21. Mr. Stevens, have you a list of the 21?

MR. STEVENS: I don't believe I have.

MR. McSPARREN: They are here but I can't read them.

MR. RODGERS: I move you that this whole subject be laid on the table until to-morrow morning's session.

Motion seconded.

A Member: It seems to me that it is immaterial who is the author of the bill; the question is, is it a good bill?

(Cries of "Question.")

The motion was adopted, whereupon the session adjourned.

JOINT SESSION OF BOARD OF AGRICULTURE, PENNSYLVANIA BREEDERS' ASSOCIATION, PENNSYLVANIA DAIRY UNION, PENNSYLVANIA HOLSTEIN-FRIESIAN ASSOCIATION AND ASSOCIATED POULTRYMEN OF PENNSYLVANIA.

The joint session of the above Associations was called to order Wednesday evening, at 7.30, January 27, 1915, E. S. Bayard, President of Breeders' Association, in the Chair.

The CHAIRMAN: The program this evening contains only one thing, and that is a meat demonstration by Prof. Tomhave, of Pennsylvania State College. You will not bother Prof. Tomhave in the least if you will ask questions as he proceeds. He will be glad to stop and answer any questions at any time while he is doing the work here, so he can show up the work.

SECRETARY CRITCHFIELD: Couldn't we ask questions in advance?

The CHAIRMAN: You can ask them right now.

SECRETARY CRITCHFIELD: Well, I would like to know what he is going to do with the meat when it is cut.

The CHAIRMAN: I think the best cuts will go to the Secretary of Agriculture.

SECRETARY CRITCHFIELD: I am sure the Board will approve that.

The CHAIRMAN: I am sure the Board will if the Board don't have to pay for it. If the Board has to pay for it, you will have to persuade them, and while he will be glad to answer any questions as he goes along, this is no funeral and no stiff occasion; the thing to do is to limber up and ask questions, and I am in a good deal better fix to control the audience tonight than I was last night.

SECRETARY CRITCHFIELD: I hope you will control it better.

The CHAIRMAN: I thought I did pretty well last night, considering the audience I had to deal with. We will just kill a little time till these men get in and get in their seats, and then Prof. Tomhave will proceed. Now, ladies and gentlemen, Prof. Tomhave, of State College, will proceed with this meat demonstration. Ask your questions as he goes along and please excuse the awkwardness of his helper, because this is the first time I have helped in this business.

PROF. TOMHAVE: If you have a question to ask at any time, don't hesitate, and you will find, as we get along, there will be times when somebody will have to work on this platform. I may be able to get Mr. Bayard to do all of it; if I can, I can keep on talk-

ing, but there may be times when I have to make some cuts and you can talk. I can answer questions just as well as not, and if you find, as we go along, that it takes a little extra time, and we apparently may be wasting some time, don't get excited, and we will try and give you something that will interest you as you go along. If anyone has come here with the expectation of seeing a demonstration, so far as skill and swiftness of cutting meat is concerned, I am afraid he or she is going to be very much disappointed, because I am not an expert at this cutting business, and for that reason you will have to endure with me. I believe, however, there are some lessons we can learn as we go along. Furthermore, I believe it is something that we should be interested in, at least to some extent, both as breeders and as meat consumers.

You have heard during the past day or two and during the past two or three years, we are more or less concerned today about our future meat supply. During the past ten or twelve years the supply of meat animals in the United States has very rapidly decreased. In the meantime, the population has increased at its normal rate. The result is that today the meat producing animals on the farms in the United States are far below normal. The result is that we have high priced meats and there seems to be an apparent world shortage of meat. I prepared a table a short time ago to illustrate by a curve the relation between the increase in population in the United States and the supply, or the increase or decrease in meat animals since 1870. I found that from 1870 up to 1900, the four lines, namely, a line of population, a line for swine, a line for sheep and a line for beef cattle, practically ran parallel in an upward trend, but from 1900 to 1907, there was a check in the three lines representing the number of meat producing animals. We find that since 1907 there has been a further decline in all three lines, but especially so far as the number of meat animals is concerned, and yet the line representing increase in population has increased at approximately 2,000,000 souls per year. That means that we are today up against a very serious problem so far as our shortage of meat producing animals is concerned, and it is going to take some time before we can again get back to our normal supply.

Now, we are not only concerned today with the problem of producing meat animals, but we are also concerned with the problem of making the most economical use of the meat animals after we have produced them, after they go to the packer and go to the consumer. While we must consider the producing end of it, yet we should also be familiar with the finished product. I have a number of times made this statement, that I believe our farmers and breeders do not know as much about the packers' business as they should; they do not know the finished product that they are preparing on their farms. They know a good beef animal when they see him and have him on their farm, but they have no conception of the carcass that the butcher and packer gets from the animals they sell. and if there is any one particular line along which we should make some effort to educate or enlighten our people, it is in the matter of know more about the kind of carcass that the butcher or packer gets from the animals which are produced on the farm. You know as well as I do that when you sell a carload of steers, a carload of

hogs or a carload of sheep on the market, that you may not get the top price, and especially so in cattle, between the top price and the lower scale, ranging anywhere from $1.00 to $3.00 per hundred pounds. Now, there must be a reason for it. The butcher and packer buys every animal on its merit; he buys the animals on the basis of what it will give him after he has taken the hide off, put it in his cooler, and is ready to sell it to the retail butcher, and those are some of the things that we should know something about. The reason for the decrease in the number of our meat animals has been stated so often that I am not going to take the time tonight to dwell on that one point.

I am going to call your attention to one thing, however, and that is, when it comes to the matter of production or the matter of putting on the market, I believe we are wasteful. We are putting upon the market in too many instances animals that do not carry fat or finish enough to command the best price, and they are sold at a loss by the farmer. In other words, if he kept those animals and fed them a little longer, he would make more money; the carcass of such animal would be worth more money to the butcher and packer, and besides that, we would get more pounds of meat to overcome our present shortage.

Now, there are several things which the packer considers when he comes to buying a carcass. In the first place, he buys everything on the basis of 100 pounds live weight; he buys on the basis of quality and on the basis of dressing percentage to quite a large per cent.; in other words, we find that beef cattle when slaughtered, will dress from 42 per cent. to 65 per cent. to 68 per cent.; or, in other words, they will give us from 42 to 68 pounds of meat for every hundred pounds of live weight. Now, those cattle come in this lower scale, those that dress the lower percentage are the ones that sell on the low scale, so far as market price is concerned. You will find that the average run of steers and heifers in good condition will range 55 per cent. to 60 per cent.; those extremely well finished, very fat, run up as high as 65 per cent. to 68 per cent. That is not all. An animal on foot carries a given amount of frame or bone, so that the animal that dresses 42 per cent. on 45 per cent. or 48 per cent. for every 100 pounds live weight carries just as many pounds of bone as does the animal that dresses 55 per cent. and 58 per cent.; in other words, when the butcher or packer buys an animal that is going to come in this class of higher dressing percentage, he gets that many more pounds of edible meat than he can get from one that dresses to the lower percentage. Now the two carcasses that we have here tonight, one is in just as good condition, an excellent market carcass, one not overly fat, one that possibly could stand a little more finish, yet it is considerably better than many of the carcasses we get. The other is a carcass that comes from an animal that should have remained in the feed lot at least three to five months longer. That animal would have been more profitable to the owner, more profitable to the packer.

As breeders, we must bear this fact in mind, that you cannot take any old thing and make a good meat animal out of it. A meat animal inherits its possibilities from its sire and dam. If you are going to grow beef, you must have upon your place a good pure bred

sire that has been bred for beef production, and the same thing is true on the female side. You will find that when these characteristics are inherited from the parents and by judicious care, economical feeding, you can produce beef of the right kind and can do it at a profit. The two carcasses we have here tonight—one is a heifer and one a steer. Some of you will say that is not altogether a fair comparison, but I have taken the precaution to make it fair; that is, the best individual or best carcass tonight is the heifer rather than the steer.

It is through the kindness of the Bengam Packing Company that we can have this material for demonstration work tonight. I believe they appreciate the lessons that we can get from these carcasses and they are only too glad and willing to permit us to have the meat. They also gave me a few figures relative to these carcasses. The live weight of the steer was 993 pounds; dressed, 49 per cent.; not quite half. The live weight price was $5.57 a hundred pounds. The cost of the carcass as it is here tonight, after deducting the labor or charging the labor, deducting the value of the hide and the fat, cost them $10.76 for a hundred pounds, dressed carcass. The heifer, live weight, was 1165 pounds; dressed, 54½ per cent. The animal cost $6.50 on foot. The carcass cost them $11.14.

Now let's go back and see what the farmer got for these two cattle. It is true, that cattle at the present time are not selling for what they have been selling during the past year, and market conditions are demoralized, but the comparison is the same; it would not make any difference whether they had paid 8 cents for one and 7 cents for another, the comparison would be the same. The light steer returned $55.31; the heifer, $75.72, or a difference of $20.41 on the two carcasses, and there is a difference of a hundred and some pounds, I haven't the figures here, but that would mean a difference of $11.84 for the additional weight which the man put on the heifer; in other words, he received $11.84 for every hundred pounds of additional weight that that heifer carried. In other words, we can assume that if that farmer had retained his steer, kept him in the feeding lot and fed him up to the stage that he fed that heifer, he would have received $11.84 for every 100 pounds of live weight that he would put on over the 993 pounds. When you figure that he would have fed that animal farm grown feeds, he would have gotten a good price for that feed, economical feeding, he could feed 75 cents corn, $3.50 silage, $15.00 hay and 35 cents cotton seed meal, and produce those additional pounds for less money than he would have spent for it; in other words, it would have been more economical for that farmer to have kept that animal on the farm, and besides increased our meat supply.

The lesson we can draw from this is that there are too many thin cattle coming on the market at the present time, and, as a matter of fact, at most times of the year. Animals should stay in the feed lot and be finished out more. The difference in the value of the carcass per hundred weight is 39 cents. Look at it from the packer's point of view, buying these two animals at $5.57 and $6.50; this carcass over here costs the packer only 38 cents a hundred more than does that carcass over there. From an economical point of view, from the point of view of the consumer and packer, this is by far

the cheapest carcass on the weight basis, yet everyone concerned was benefited by putting out a carcass of that kind. The difference in live weight is 93 cents between the two—nearly $1.00 a hundred. I wanted you to have those figures so we could know what we are doing. I am going to take these two front quarters first and I want to call your attention to one or two things; in selecting animals on foot for meat animals, we try to get them well developed over the rib and over the loin and to have well sprung ribs, to have that flesh well carried down over the ribs. There is a reason not only from the point of view of the farmer, but the packer, and he is the man who should not be lost sight of. We sometimes find that animals that are not so well flesh, over the ribs and over the loin, will probably make just as many pounds of gain in the feed lot as will an animal well formed or well filled out in these respects. What does that mean? That means that that animal is putting the fat on its side and on the part of the carcass where we don't get the value of the cuts, and the result is that from the packer's point of view, it is not economical and he pays less for that sort of an animal. What he wants is to get a large amount of rib, a large amount of loin, or he wants to get that body weight or dressed weight in the ribs and loin so far as possible. The reason is this, that out of the ribs and out of the loin we get the high priced cuts or the most desirable cuts from the commercial point of view. That chart over there illustrates that point. We find that on the market that the weight of the two loins from the beef represents about 17 per cent. of the total weight of that carcass. They represent, however, 33.66 per cent. of the value of that carcass. The round represents 23 per cent. of the weight and 19.67 per cent. of the value. The chucks, which come, as you notice, out of the fore quarters toward the front of the carcass, a cheaper cut, more bone, more tissue, represent 26 per cent. of the weight and 18.31 per cent. of the value. The plates and other cheap and inferior cuts in the lower part of the carcass represent 13 per cent. of the weight and 9.01 per cent. of the value. The flank, another cheap cut from the lower part of the carcass, represents 4 per cent. of the weight and .89 per cent. of the value. The ribs, another high priced cut, represents 9 per cent. of the weight and 15.47 per cent. of the value. The shank represents 4 per cent. of the weight and 1.49 per cent. of the value. The suet represents 4 per cent. of the weight and 19.01 per cent. of the value; so that the packer has an object in view when he buys an animal which has well developed ribs and well developed loins, and we must get these things by breeding if we are to supply him with that kind of an animal; that is the reason there is such a difference in animals on the market. He is willing to pay more money for animals that carry the weight in the desirable parts of the carcass.

Now, the question probably arises, "Why is this meat more desirable and more expensive?" The reason for it is that it represents the tenderest part of the carcass and that portion which carries the least amount of bone. You will find that whenever you get a rib out of the center of the carcass or a piece of the loin, as you notice on that chart, you will get a tender piece of meat, providing it does not come from an inferior or old animal. Now, in cutting meat commercially, the butcher and packer makes it a practice to separate

the cheaper or thinner cut of meat from the thicker or more expensive cuts of meat. We say we want the animal with well sprung ribs; that gives more surface and more place to put natural flesh. We want him to carry that natural flesh well down over the ribs instead of running at an angle and becoming thin, because, whenever that is the case, the butcher and packer can get a longer rib and it gives him a higher per cent. of that high priced meat, and that is the thing he is after, and he is perfectly entitled to it, because it is a legitimate way of cutting.

Now, the first thing to do is to remove the shank, as indicated on that chart, and we do that so that we can get at the plate a little later on. Now there is a piece that goes for soup bone. I am going to cut the shank off the other one and you will find in these two carcasses, as we go along, that one carries fat enough in practically all parts of the carcass to make it tender, make it juicy and give more pounds of edible meat with every ten or fifteen pounds of meat that you buy. You notice even in the shank now that the thing that we want is to have some fat with the lean. Too many, I am afraid, want all lean. Now, you cannot buy all lean meat and get tender and juicy meat; you must have fat and lean mixed together in order to get quality, in order to get flavor and in order to get tenderness. Comparing these two carcasses, for instance, there, you have one that is practically all lean, this one carries not only fat over the outside, but you notice that the fibre has spread in it some fat. What is the result? The result is that the bundle of muscle fibre in this carcass has been forced apart, that the bundles are forced apart over here, while there they are in close contact, and the result is that that piece over there is tougher than this one. The thing that makes meat tender is the fat that it carries in addition to the lean, and an animal you put in the feed lot will start and put a little fat on the outside, he will put some fat on the inside after he has supplied the outside; then he begins to spread it between these bundles of muscle fibre, and that is the thing that gives you the thickness in the feed lot, it is not that you are putting on a lot of flesh. When you put him in the feed lot to fatten, you are putting on fat rather than any amount of flesh. The animal inherits his flesh naturally. This carcass has fat over the outside, has some on the inside, and has it distributed through the bundles of muscle fibre, whereas, that one over there is practically bare over the entire carcass.

I want to give you a chance to look at the side of these two carcasses. There is what you want to notice. I want you to get the comparison of these two carcasses, so far as the outside is concerned. There you have fat on the outside, and on that one over there in practically every place the bundles of muscle fibre are showing through: it does not matter where we make a cross section, where we cut the carcass, you will find that is the truth. I am going to remove the prime ribs of both carcasses. Now, the place to cut the prime ribs from the plate will depend somewhat upon the thickness of the carcasses. We generally cut where the meat runs the thinnest or keep this bundle of muscle fibre, which we want to use for roasts. When an animal is fleshed over the side, over the ribs, over the side, the butcher can cut you the ribs longer; that is the

reason we want that conformation of the beef animal on foot, and you cannot take any old animal of any description and type and make a good meat animal out of him. This is an economical and convenient way of cutting a carcass, though not the only way.

Now, there is a cross section of that plate. Take the plate from the other quarter. We want that thickness carried well down over the side. You will notice when we come to these two carcasses, this one over here is considerably thinner. You can see for yourself the difference that exists in these two cuts of meat. Notice there all along we have plenty of fat, enough to make it a good, tender, juicy piece of meat, even though it comes from the plate, whereas, in this carcass you have little or no fat, which is bound to make that piece of meat tough; yet a great many people go to the market and will buy this piece of meat and then think they are buying meat economically; they are buying more bone and a much poorer quality of meat. You notice, further, that there is only a difference of 38 cents a hundred pounds, so far as the packer's price is concerned, between this carcass and that. The packer paid 93 cents a hundred pounds less for that animal than he did for this one. Now, from his own personal point of view, he paid too much money for that one if he bought this at the right price. If he bought that at the right price, he bought this too low.

Now, the next cut is to remove the prime ribs. I am going to take off the seven ribs, because that will give you some idea of what this portion of the carcass looks like. In cutting meat, there are several rules that we try to follow, so far as possible. One of them is to separate the higher priced or the thicker cuts of meat from the thin or inferior cuts of meat. The second is to cut across the grain of the meat so far as possible, and the third is to use your knife in cutting meat and use the saw to cut the bone because if you try to cut the meat itself with the saw, you are going to gnash it and tear it all to pieces, and if you try to cut the bone with your knife, you will find that the knife will not hold an edge, and besides that, you cannot make a smooth cut. That plate may seem like a suggestion to a kindergarten, but it is not, it is something that a great many people don't stop to realize. We are cutting every one of these cuts, making every one of these cuts in identically the same place. You can see for yourself the difference that exists. This, of course, is a somewhat smaller carcass, yet I could not possibly cut it down lower because it does not possess near the thickness, even there, that this possesses.

Furthermore, you notice the difference in the shape of that bundle of muscle fibre as compared with this. Here you have a V-shaped piece and this line runs almost straight to the tip of the vertebrae down to the side of the rib. In this you have that arch that we desire in the ribs of animals for the feed lot or butcher. Then notice the wonderful sprinkling of fat in that lean. That is the thing that gives you volume, gives you tender or juicy meat, and the thing you should always look for when you go to the meat market to buy a piece of meat and when you are killing an animal for your own use at home; don't take the poorest but take one that is well fed, well finished, and then you have something that you can enjoy and relish. We have here a higher per cent. of the weight of the carcass than we

have in this case, yet we have been fair, we have cut this down just as low as we can possibly cut it without getting too much of the thin meat. You will find that that same thing exists throughout the entire carcass.

I am going to remove the lower portion of the shoulder, so as to show you that no matter where we cut, that same relation is found. You will notice there nothing but lean and bone and no fat. Now, let us make a comparison of the ends and make a comparison of these two; notice that beautiful bundle of fat all the way through, fat distributed in that lean gives you the thickness; no matter where you cut the carcass, you will find that same condition exists throughout; yet here is a carcass that costs within 39 cents a hundred pounds as much as that carcass over there; so you see that the packer also buys a carcass of this kind and sells it at a loss, or if he does not sell it at a loss, the consumers that buy the meat are not buying economically. This much must be said: I personally would much rather take a piece of meat from a carcass of this kind that was cut from the plate, from this piece right here, than to take a piece of meat from the prime ribs of this carcass. In the first place, I could buy it for considerable less money; I would find it tenderer, more juicy, more palatable than the piece I get right here, because there we have fat in addition to the lean and it is a more inferior cut and you can buy it for less money; now if you will bear with me for a few minutes, I want to fix up one or two pieces of meat. Possibly somebody has some questions by now. If you have, fire away.

SECRETARY CRITCHFIELD: Where does the piece that in some localities is called "shoulder clod" come from?

PROF. TOMHAVE: It is this bundle of muscle fibre right in there. When you get a shoulder clod, we cannot follow this method of cutting, and the shoulder clod, generaly speaking, is taken out of thin carcasses not suitable for cutting roasts and comes right out here or right back of the shoulder where there is a clear bundle of muscle fibre that you can strip from the bone, and that is what is known on the market as the shoulder clod. Now, are there any other questions? Another thing you should bear in mind, holds true with all classes of meat animals, and that is that the tenderest meat is found in the center of the carcass, namely along the ribs and the loin. The further you go towards both extremities, the tougher becomes the meat.

SECRETARY CRITCHFIELD: Well that is probably owing to the fact that there is where the dogs make their attacks.

PROF. TOMHAVE: I don't know how much the dogs have to do with it, but the reason is, I think, that the bundles of muscle fibre along the back contain very little cartilage and connective tissue; they shorten towards both extremities, have considerable more cartilage, bone and connective tissues, due to the fact that there is much more articulation than there is along the loin and the rib. There is practically no articulation there at all.

A Member: What is the age of those carcasses?

PROF. TOMHAVE: I cannot tell you exactly so far as time is concerned, but both are young carcasses. I would imagine from the

appearance of the bone that neither is more than 20 or 25 months old. They are both young animals, as you notice from the color of the bone. We can always tell whether or not a piece of meat comes from a young or an old animal by the appearance of the bone. You find that at the tip there is always more cartilage and the bone is more porous and red in appearance. As the animal grows older—an old cow for instance, you will find that that bone, when the backbone is split, it becomes hard, white and brittle. The same thing is true when you cut across the bone at any place, it has the appearance—notice there that red appearance—that is an indication of youth in a carcass. The same is true there. In an old animal, that bone is very hard and white.

A Member: Does the breed of the animal affect the color?

PROF. TOMHAVE: Very little, so far as beef breeds are concerned. When you get to dairy breeds, you find that you have a yellowish bluish color, but so far as the beef breed is concerned, it makes little difference.

A Member: Does the protein have something to do with the color of the meat?

PROF. TOMHAVE: It always does; the protein is necessary in order to develop the muscle; you cannot get the muscle without the use of protein.

A Member: I have killed several Jersey cows myself and get as nice, white meat as anyone.

PROF. TOMHAVE: I'd want to be sure about that. I have killed a good many Jerseys, and although they were fed just like the rest of the cattle, I did not invariably find that underisable color. No matter what you want to do with the carcass, the combination of flesh and fat will always give you the most desirable cuts of meat, no matter what it is used for, whether it is used for hamburger or anything else, you get a much better quality of hamburger from a good carcass than from a poor or inferior carcass. Now I am going to play the role of butcher. I am going to ask you a fair question and I want you to be fair with me; suppose you come into my shop and want to buy a roast for Sunday dinner; I am putting these two out, I have them right on the table like that, and this is labeled 12c a pound and this 14c a pound; how many would take the one on the right hand side? Let's see your hands. How many would take the one on the left hand side? Let's see your hands. How about the other fellows? Well, there's a few that would take it. Well, how many know what I did? I took the ribs out, yes.

A Member: That assistant of yours knows.

PROF TOMHAVE: Well, now, I'll tell you what I did; I took that plate or inferior cut from the good carcass and I have it in my right hand; I took the prime ribs out of the poor carcass and I have it in my left hand. How many would buy this in preference to this if I were putting the two out at the same price? How many would take this? Well, there are only one or two and one of them is a

dairyman anyway; I know that. But you will find that so far as buying economically is concerned, you can buy almost day in and day out at your shop or any other meat market, this piece of meat for considerably less money than you can buy this piece, and I personally would much rather take this from a good carcass than this from an inferior carcass, and it seems to me that the lesson this thing brings home to us—suppose I had taken this piece and taken out about three ribs and cut them off, why, you would have a beautiful roast and there's a big difference between the two. You notice that is thin, very little meat on the outside, a higher percentage of bone than we get in this rib right over here. Are there any other questions about the forequarter? We will have to move along or we will not be able to get through.

A Member: Which of those quarters would have the most weight of bone?

PROF. TOMHAVE: This one over here would run four or five per cent. more edible meat than we would get in that other one. You take your two animals, for instance if we dissect them, take out all the bone—there's very little more bone in this carcass than in the other one. In the other case it is simply a question of putting on the fat. This one is carrying and building up muscle tissues that is not present there. There is more bone in the other one; there's four or five per cent. more edible meat in this carcass than the other, so there is a higher percentage of bone over there. You will find that the same general relation holds true so far as the hind quarters are concerned. Here again we must remove the inferior pieces or the cheaper cuts of meat from the thicker or more expensive. Now, if you go to the meat market to buy a piece of flank or buy a piece of meat that has that little gland present, don't send the meat back and tell the butcher it's no good, because wherever you find a vein of fat in the animal's body, you will find one of those glands. It may be very small, but it is here; in that bundle of fat we always find one that is comparatively large. Coming to the question of tuberculosis, for instance, the statement is made that tuberculosis may be found in any portion of the beef, for instance, except the hoof and the horns. Sometimes when it is impossible—when you don't find the presence of tuberculosis in the lungs, glands on the lungs, on the mesentery, you may find them in some other portion of the carcass. When you find this gland filled with hard calcareous matter, that's the kind you want to refuse and don't buy it, and don't use it. If you slaughter that sort of an animal and find those conditions present in an animal that is slaughtered on the farm, don't use it because that is an indication of tuberculosis; but when that gland is perfectly smooth, as this one is, it is all right.

Now you notice in the case of the hind quarter, you have present the udder. When you sell a dressed carcass to the butcher, a heifer carcass, don't cut it off—that is, if it is a cow, don't cut it off, because he will know you have taken it off, so as to try to deceive him; you can't do it anyway and you are simply disposing of some of the weight of the carcass. You notice we have one little gland there, and there is the other, similar to the one I showed you in the other carcass. Wherever there is a vein, you will find those glands pres-

ent through the entire carcass. That flank is about 50 per cent. fat and connective tissue. The rest of it is a comparatively tough piece of meat, yet notice here, comparing these two flanks cut in exactly the same place, that you have in this one more quality, more fitness. Notice the way the fat was forced through those bundles of muscle fibre—how it has forced them apart, which give you volume, gives you tenderness in that piece of meat, so that it don't make any difference what part of the carcass you make your cut in, you will find that same condition true. If you go to the market to buy a flank steak, this is the piece you get, this pear shaped piece that lies under the udder. Now I am going to cut the loin from the round as indicated over here. Rump and round together make what we call commercial loin, and the loin is the full loin. There are different methods of cutting that, but we shall cut so as to make the cut almost parallel to the back of the round. Now the place to cut this is just at the rise in the pelvic bone and feel for this bone right there. Just cut in front of them and then almost parallel with the back.

A Member: Have you any idea of the weights of those two carcasses.

PROF. TOMHAVE: No, I could not get those figures. They were bought from different parties; no doubt the better carcass cost more money but the man got more money for it. He got $11.84 more for every hundred pounds put on over the other one, assuming they were both in the same condition at that weight; $11.84 for every 100 pounds put on over the 900 pounds of the other one. I want to bring these two together so as to make the comparison. You notice that no matter where we make our cuts—see we have taken the loin from the round, cut identically the same place; look at the difference; sirloin steak in both instances. How many people in this audience would not pay five, six and eight cents a pound more for meat of that kind compared with meat of this gind. I think everybody would. How many would be willing to give me 30 cents a pound for this if I sold this at 24 cents? How many would take this at 24 cents in preference to the other at 30 cents a pound? Just one man. Well, I'd like to be near when he got to chewing this. This is the kind we sometimes get at hotels and restaurants where they don't pay very much for meat. This is the kind you get when you order a good sirloin steak. Now the porterhouse steak comes from the center of the loin. Unless you are anxious to see the porterhouse steak, I am not going ot cut it. How many would like to see the porterhouse steak? How many would not care to see it? I don't know what to do.

SECRETARY CRITCHFIELD: Don't cut it if you don't care to; you have told us where it is located.

PROF. TOMHAVE: It spoils the loin. I want you to notice one thing; not only do we have that difference when we make our cross section, but let's compare the two. There you have the outside of the two, no matter where we cut, no matter in what portion of the carcass we work, we always find that difference; that is the reason that this carcass over there is so much better than the other one. Notice that layer of fat there. I want to call your attention to one

thing, however, this animal was kept in the feed lot and fed until it was very fat, you would found rolls of fat over the outside We want that fat but we want it uniformly distributed over the outside of the carcass and well mixed in with the lean, then it becomes a commercial product. When we get it in lumps and bunches on the outside, the butcher and packer must sell it as rough tallow. Whenever you get a heavy bunch of fat on the outside over the rib or back of the rump, it means that the butcher must cut that off and throw it into the tallow basket and it goes for four or five cents a pound; whereas, if distributed evenly over the loin, it goes for 35c a pound.

SECRETARY CRITCHFIELD: Is it possible for the butcher to tell how that fat on the outside is distributed before the animal is slaughtered?

PROF. TOMHAVE: Absolutely. You can tell by running your hand over the outside of an animal or even look at him, whether the fat is evenly and uniformly distributed. You ought to be able to tell exactly what is under that hide, and you can only learn that by practice and observation. You take the hide off of an animal and observe the carcass—

A Member: Doesn't it make quite a little difference how the animal is fed—it's putting on fat?

PROF. TOMHAVE: Most decidedly. This one here received possibly nothing more than a maintenance ration, was never fed more than enough to keep up the minimum rate of body growth, to say nothing of putting on a surplus amount of flesh and fat.

A Member: I mean having it in chunks—doesn't it make a difference whether you feed a balanced ration?

PROF. TOMHAVE: Oh, no, that is an inherited tendency.

A Member: Entirely?

PROF. TOMHAVE: Almost entirely. You can eliminate that by breeding and selection. I want to call your attention to another thing. Meat is tough after the animal is first slaughtered, no matter how choice an animal you have. It takes four or five days before there is a breaking down of the muscle fibre. There is a chemical change that takes place in that carcass that makes the meat tender. Now, in order to do that, in order to keep that carcass in good condition, you must be able to let it hang a week or ten days or even longer. Carcasses sometimes hang three or four weeks, before they are disposed of, but a carcass like this would be all dried up, there would be too much evaporation; the moisture in that carcass would be entirely gone; you would lose too much in weight. This carcass that has fat on the outside, you can hang it in the cellar, leave it there a week or ten days or two weeks. and the meat improves with age, becomes tender, there is no evaporation of moisture because the fat holds up that moisture in there, and even though it ages a little bit, sometimes when you see this mould growing on the outside, take a dry cloth and wipe that off. That removes it absolutely and you have a piece of meat that is tender.

Another thing, I notice the difference in the quality of the kidney fat in the two carcasses. This kidney fat accumulates before the animal puts fat on the outside. You will find when an animal starves to death and all the fat is gone, you will find that the last fat that disappears is that which is found around the kidney. Notice the difference in the covering of those two. You have more kidney fat. It is true that that is cheap and inferior compared to the loin, but you cannot get the good loin and good rib and finish without getting that kidney fat in the carcass. Another thing, I want you to notice the difference in the quality of fat in these two. Notice there how brittle, pretty near as good as butter, this fat is; it is better than some butter. This other fat is springy and tough and has no quality. So it does not matter what portion of the carcass you have worked on, you will find that that same difference exists. Now we will not cut the line further; you can see the two ends over there. Notice that difference in the thickness and volume, that beautiful meat there, and on the other side you have no marbling at all whatever. By marbling I mean the intermingling of the fat.

SECRETARY CRITCHFIELD: Tell us where the tender part of the round is located.

PROF. TOMHAVE: I will cut across that just in a minute. The tenderest portion of the loin is right in here in this porterhouse or the small loin end; we have there the sirloin muscles on the outside and the heavy tenderloin muscle on the lower side of that vertebra. The bone steak that you buy is what is commercially known as the porterhouse steak. Some of you buy tenderloin steaks, occasionally buy it in the hotel; some of you ordered some for supper tonight; you thought you gave yourself a treat, but I'd a good deal rather have a sirloin than a tenderloin steak, because tenderloins are never taken out of carcasses of this kind, they are taken out of the cutters and canners carcasses and the chef is permitted to do the rest. He uses the larding needle and all the rest, but you are not giving yourself such a treat as you think you are.

I want you to notice the outside of the round. Here again we have that difference in covering. Notice that difference in covering. Here we have no covering at all, whatever. That has some fat; that is not covered as much as we would like to see it, but you will again find that the two extreme ends of the carcasses are covered last; you will find that this portion is the last to be covered in a good, choice animal. It's the same way with the front shank. I don't believe I will cut the round to give you the cross section, because they like to sell the round just as I have it cut here, but in answer to Secretary Critchfield's question as to which portion of the round—well, I will cut the poorer one, I will not cut the other one.

The CHAIRMAN: We don't like to cut these, because the gentlemen furnish this meat without any charge.

SECRETARY CRITCHFIELD: It is not necessary to be cut; just tell us which side of the round it is located on.

The CHAIRMAN: We don't like to spoil the meat any more than we have to.

PROF. TOMHAVE: In removing the rump from the round to get your round steak, cut just below this pelvic bone and parallel to it. Now this portion right here is the best portion of that round. This heavy bundle of muscle fiber without very much cartilage and connective tissue—this bundle is smaller, more cartilage and connective tissue than you have on this side, but if you were buying round steak and wanted the best cut out of that round, the nearer you could buy it in the center of this round, the better the cut. In other words, the first two or three cuts from the round are inferior, as compared with the fourth, fifth and sixth cut and from there on, as you get down this round, you will find they become tougher on account of this large amount of cartilage or connecting tissue that binds this together. As you get down here, you will find that it becomes almost half cartilage and that it is very tough as compared with the round.

Now any questions you would like to ask about the beef, I will be glad to answer. If you have no questions, we are going to proceed to cut the side of hog which Belcher & Company kindly furnished us. There are a number of different ways of cutting a pork carcass. Most of you may have your own ideas along this line, may have your own method, and no doubt it is a good one. I am going to cut this carcass tonight by what is known as the commercial method of cutting pork carcasses, as the packing house method. That is the most desirable, the most economical method so far as the packers are concerned, and it certainly should be the most economical and most desirable method of cutting for the farmer, because the packer has spent years in working out these problems. Every cent or two that can be saved on a hog carcass runs into hundreds of dollars throughout the year when you consider the large number that are being killed. A great many farmers, after the hog has been slaughtered, insist that the carcass must be cut that same day. Now I do not believe that there is a man here that can make a good, smooth, uniform cut in a warm carcass. I have never been able to do it and I do not believe you can do it, because it is too loose and too flabby. Now you are not so busy that it is necessary for you to get through with that operation that same day. If butchering time comes and your neighbor is helping, slaughter your hogs in the morning and his in the afternoon and go after it the next day and cut the carcasses after they are thoroughly cooled and the meat set. A carcass should always be thoroughly cooled before it is cut up into retail cuts and before it goes to the curing vessel, and we also want it firm and well set.

I requested them to give me a side of hog leaving the head on the carcass, splitting it right through the center. How many in this audience, in splitting your hog carcasses, split it right through the middle of the backbone? Let's see your hands. Quite a number. How many split it on each side of the back bone, to take out that backbone, or chime as you call it? Let's see your hands? Well, the majority. Now my contention is that this is not an economically way of cutting that pork carcass. You will say "yes, but I must have that backbone, I want to boil it." All right.

SECRETARY CRITCHFIELD: Need it for sour krout.

PROF. TOMHAVE: Yes, very true, but I will show you a little later on, if you take that loin out, take out what is called the commercial or packers' loin, you have more of that meat and you have prepared that loin in a way that it can be used for a roast or for chops and it is used economically. Nature has provided every animal with two sides, right and left. If you split that animal directly in the middle, you will find that the entire carcass is protected on the outside by the hide, there is a thin vellum that separates the two sides, goes down the backbone and down the lower line. If you split that carcass exactly in the middle, you will find that you have left that thin membrane covering all the edible portion of the carcass. I will show you later on why I want you to split it down through the center of the backbone.

In removing the head, we want to cut about an inch back of the ear. You notice it is very easy to remove that head if you do that; try and strike that atlas joint. If the carcass has not been split before the head is removed, you can always strike it. If that cut comes around there just about an inch back of the ear, you will find the atlas joint and head can be taken off without any trouble. That head is used for head cheese, sausage, baked beans or whatever you want to use it for. We have in this carcass the leaflard or kidney fat. I asked them to leave the entire carcass intact, which they did, but when you are slaughtering animals for your own use at home or those you are going to sell to the butcher while the carcass is warm, start right at the point of the rib and pull out this leaf lard. There are two reasons for it. One of them is that it comes out so much easier when the carcass is warm and it also aids in cooling the carcass.

Now you probably raise the question, you will say, "Well, it may be all right if the butcher wants it, he is entitled to it, but it is to his advantage to remove it, lift it out, spread it out so that it can cool thoroughly. You will find that you will have little or no trouble with soured loins or soured hams. If this kidney fat is left in as in this case you will find, especially in heavy hogs, that it has a tendency to hold the heat in the loin and in the lower portion of the ham. The result is that frequently that sours and spoils. It is all right for the butcher to have it, he is entitled to it and you should supply him with it, but pull it out, cool it thoroughly, and take it with the carcass, and in spreading this out on the table, put the portion next to the flesh portion of the carcass up. The side that has the thin vellum of membrane should be next to the table. Here again we follow this general method of cutting, namely, that the cutting across the grain of the meat as far as possible, separating the cheaper cuts of meat from the more expensive. Generally speaking the shoulder is cut from the middle, between the fourth and fifth rib, but that cut may vary, depending on the amount of loin you want, and if you want a large amount of loin, you can cut a short or smaller shoulder. If you want a large amount of cured meat, you can cut between the fourth and fifth or fifth and sixth rib and in that way get more of that meat. There you have a cross section of the shoulder, fat on the outside, that spinal column split practically through the middle. Notice the way that bundle of muscle fiber there is protected. If you cut that on the outside, you

would cut right through the center of that and spoil it for roasts right here, and much more so when you come to the loin. Now this shoulder may be cut into what we call a long shoulder or it may be cut into what we call a short shoulder or calf cut shoulder. But before you put this into the curing vessel, remove the rib from the inside of the shoulder.

A Member: What does that hog weigh?

PROF. TOMHAVE: I couldn't tell you, I couldn't get the weight of this hog; I didn't tell the manager to get it for me, so I don't have it. In removing these spare ribs, cut as close to the rib as possible.

The CHAIRMAN:You don't sandpaper the ribs like they do in our town?

PROF. TOMHAVE: Well, you can't blame the butcher for cutting them that way, because he gets more money for the shoulder than he does for the spare ribs. Now these are what is known as the neck spare ribs or the most inferior ribs that we can get out of the carcass. Those that we get from the middle are choicer and more desirable. Now don't put this shoulder into the curing vessel just as I have it there, but remove the scrag ends and use them for sausage or for lye. To put a shoulder into the curing vessel just this way, you will find these scrag ends, after they are through the curing process, have been smoked, become hard and dry and have been wasted, so take your knife and trim the shoulder neatly. The idea is to remove the scrag edges as much as possible. Also remove some of the heavy fat that is found over the back of the shoulder. Now notice how much better that shoulder would be to go into the curing vessel than if you leave the scrag ends and square corners there.

A Member: Do you always leave it that thick?

PROF. TOMHAVE: Yes sir.

A Member: Isn't that liable to dry out?

PROF. TOMHAVE: No, because the deeper you go into the rib you are in the lean constantly and it will keep on drying till you get to the fat and you want to leave as much of this lean on as possible. We leave a covering on the outside of this shoulder. See? Remove the shank in this manner. There is your shoulder ready for the curing vessel. You can use this shoulder for fresh meat, for shoulder steak or for a roast. Very often the top of the shoulder is cut off as illustrated in that chart and we have what we call the shoulder or Boston butt, and then trimming up the balance of the ham gives us what we call the calf cut shoulder; I should not say ham. If we cut about a little better than a third from the top down, that will give us a short shoulder. Now you notice there we have a covering of fat on the outside. That should always be removed and used for lard, if you want a large quantity of lean meat; and in the packing house they are frequently cut this way. Here we have the butt fat, this is what you get if you buy Boston butts. The top of the shoulder is what is commercially known as the Boston butt, and is used for roasts or used for steak or chops, but when you buy this, you should not pay as much as you pay for the chops out of the loin, because it is an inferior piece of meat as compared to the

loin portion, because it comes from the front portion of the carcass. The fat then is used for lard. Now if you were to cure this, we want to trim up the edges the same as we did on the full shoulder. There is your calf-trimmed shoulder; a small piece, very convenient for a small family. If you want a large amount of fresh meat, that is the way to trim them it gives you a small shoulder.

Now the next step is to separate or cut the ham from the middle. Now there is no set place to cut that. If you want a large amount of ham, you can cut pretty well towards the loin. If you want only a small ham and a large amount of loin, large amount of fresh meat, you can cut it fairly well back. The place for the back cut depends entirely on the condition of the trade. When the fresh meat trade is strong, when there is a heavy demand for loins and the cellars are fairly well filled with hams and there is not so much demand for hams, the packer is going to cut the loin long, cut lose to the ham, but when there is a strong demand for hams, he will cut them longer, especially if there is not much demand for loin. Remove the lower portion of the flank in that manner when you make you cut across here. Do not come across at this angle but cut on this angle, and if the cut is made right back of the pelvic bone at an angle of 45 degrees, this portion is left on the loin and can go as a commercial loin if you are selling it on the market, and it gives you a pound or a pound and a half more of marketable meat. Suppose we cut across there—this would not be fit for chops or roasts and it would have to go for sausage meat. Now that ham is partially trimmed. I remove some of this fat, just enough to keep the outside of the lean covered.

A Member: What would you call that, a bacon type of hog?

PROF. TOMHAVE: No, this is the lard type. A hog that carries as much fat over the back in proportion to the amount of lean is a lard type. Notice the large amount of fat; it would take a considerably larger hog that this one, the bacon type, to carry that amount of fat over the outside. In heavy hogs these hams are frequently skinned; in other words, when there is more fat on the outside of the ham than the cured meat trade demands, that is trimmed off and goes into lard, because it is more economically used for that purpose.

A Member: What breed of hog is that?

PROF. TOMHAVE: I presume it's a Berkshire.

A Member: It hasn't got a Berkshire head.

PROF. TOMHAVE: I will let you speculate on that; he has got the short, chubby ears. Now here you have your ham in this condition. Sometimes in heavy hams we find that it is necessary to take out this bone, but in a medium sized ham in this size, it is not necessary to do so. Now I want to call your attention to this one point; you notice how well that bundle of muscle fiber along that backbone is protected; notice this spinous process covering it—this fat on the outside. Now, when we split down the side of that backbone, that is just about where you make your cut, isn't it? Or do you cut down a little bit further like that?

SECRETARY CRITCHFIELD: About there.

PROF. TOMHAVE: All right now, that's what you do; then you leave the entire backbone in one piece; you have a small amount of meat on each side; you haven't a piece that you could carve when it comes to the table, because the vertebras are held intact. Further than that, you put that piece of meat in the oven to roast it and you will find that instead of having the juices in the meat when you get through, they are in the dripping pan and that bundle of muscle fiber is hard and dry, because the whole thing has been opened up and you are losing a large amount of nutrients, besides which you are reducing the palatability of that piece of meat.

Now, take that heavy bundle of muscle fiber right there; it is exposed and if you put it in the curing vessel it comes out hard and dry and you are not making the most economical use of that piece of meat. Now, then, in curing meat we want to expose as little of the lean as possible; the lean portion, such as the loin, should always be used as a fresh meat product. There is a certain trade, and it is very limited at that, English trade, that demand that sort of a cured product with just the center of the backbone taken out, but that comes from a light hog and there they cure the hams and the bacon and the shoulder all in one piece or sometimes with the shoulder removed. There is a very limited trade that demands it and the packers to-day are cutting the hog's carcasses by taking out the commercial loin because it is by far the most economical method of cutting it. The way you do that is to separate the loin, as indicated on that chart, from the bacon strips or the middle right there where we find that break in that bundle of muscle fiber, and make that cut something like that on that end. On the other side, we cut just below that heavy bundle of muscle fiber, then make the cut parallel to the backbone, with the result that we have here the loin with its fat back. Don't take this and let it go into the kitchen in that manner, don't take your knife and cut or chop off that end or a roast or whatever it may be and ask the good housewife to use that for a roast, because there is too much fat there and in this day and age we don't require, we don't care for as much fat as our forefathers. This fat should be taken from the back of the loin and cut up for lard. You will find that the average farm home never has any over-abundant supply of lard. Take that fat off the back of the loin, just leave enough there for a covering and put it in the lard kettle and you will get more out of the carcass and the housewife will appreciate it a good deal more and you will find that the youngsters will not be compelled to cut off this piece of fat and put it at the side of the plate, which they are bound to do if you try to make them eat it.

A Member: When we take that middle strip out, we get it all at once.

PROF. TOMHAVE: We will come to that in a minute and I will show you where you are losing out. In the packing house they have what they call a draw-shade that takes this fat off of one piece that is made to fit the back of the loin. Since we don't have one of those here, we will have to do the best we can with this knife, but when you remove this and must mutilate one or the other, mutilate the fat

back portion because that is going into the lard kettle. I left a little too much fat on there.

SECRETARY CRITCHFIELD: The Jack Spratts are not all dead yet.

PROF. TOMHAVE: I know, but they are too few and far between. Now you notice here we have the fat back taken off, nothing but fat, just a little sprinkling of lean there, but notice how much better it is to put this into the lard kettle than to try to make the boy or girl or even yourself eat it. You don't care for it, some of you may think you do, but you really don't.

A Member: We used to.

PROF. TOMHAVE: Yes, but you don't any more. Twenty-five years ago you would think nothing of taking that whole loin and cutting a piece off and eating that fat, but you don't eat it to-day, you have passed that stage. Now here we have a commercial loin. I am sorry that I haven't a small cleaver, I asked for a cleaver and they sent me a splitting cleaver, but we will get that all right. Now there you have that beautiful bundle of muscle fiber over the back of the loin, protected from every side. Notice this rib on the inside, this spinous process there that layer of fat on the outside. You can put that into the oven and roast it and retain all of these juices, but if you cut right through there, you have mutilated that beautiful piece of meat, you are putting this choicest portion of the carcass into the curing vessel, drying it up and wasting a very choice and palatable piece of meat, whereas, if you leave it in this manner, you can prepare it for roasts, you can prepare it for chops, and put a piece of meat on the table that you can carve with pleasure. When you cut this cut, as you say you do, you have the other side in exactly the same condition. The result is that these vertebrae, held together as they are, it is impossible to get to them and separate them so that you can carve through and cut across the grain of the meat. Your wife will tell you that the way to carve meat is to cut across the grain of the meat. If you were to carve this loin, you would want to cut across this way, but you cannot do it where that line is left entirely intact on both sides.

Now, what you want to do is to take a cleaver, if you happen to have one, and if you do not, take a hatchet or take an axe and just break through the back of these vertebrae. You notice there in one place where I cut in too far, the muscles are all cut so that when you put that on the table and start to carve there, you can get through that rib, which is impossible if that loin is left intact. You can sear this end, turn it around and sear the other end, put it into the roasting pan and there is absolutely no chance for the juices to escape, and when that pork roast comes on your table, you will have something you will relish; it is not hard and dry. All the moisture it contains is kept in there, and that is what we want and that is the thing that makes a piece of roast desirable. If you were to cut this up for chops—now another thing, just think how much more you would enjoy a nice pork chop like that than to have it cut off there, with that bone in the center coming from both sides, a little piece on the outside, a very small amount of meat there and mostly bone,

have a pick a little off on each side; but when you have this chop all intact, look at that beautiful bundle of muscle fiber, how much more attractive it is, and you will get more enjoyment out of it and certainly you are making a much more economical use of the carcass than where you split right down the backbone.

Some of you are interested to know where the tenderloin is found. There, notice that beautiful piece of meat. This is the portion that comes right out of that portion of the carcass and corresponds to the porterhouse steak of beef. Your heavy bundle of muscle fiber or the sirloin muscle on the outside, the tenderloin muscle below that bone —notice how that is separated. If I'd cut a little further down there, we would have that same T-bone we get in the case of steak.

SECRETARY CRITCHFIELD: That is what we call the fish.

PROF. TOMHAVE: Yes tenderloin is a nice piece of meat, I admit, but you get so much enjoyment out of eating it when you eat a sirloin and tenderloin together.

A Member: When you put the tenderloin in sausage, how do you cut it then?

PROF. TOMHAVE: You don't want to put the tenderloin in sausage; take the trimmings, the more inferior parts, for sausage.

A Member: Down our way, practically all of it is put in sausage.

PROF. TOMHAVE: The whole hog?

A Member: All the tenderloin.

PROF. TOMHAVE: Then you are putting into sausage the best piece of meat you are getting out of that whole carcass.

A Member: It makes better sausage meat.

PROF. TOMHAVE: I'd rather have mine fresh.

A Member: What part do you put into scrapple?

PROF. TOMHAVE: Generally trimmed portions, portions from the head and pieces of that kind go into scrapple, the trimmings. When you remove these ribs, cut just as close to the ribs as you possibly can. There are what we call the prime spare ribs. If you want to buy spare ribs, these are the ribs to buy rather than those I took from the neck, because these are more tractable and other choicer ribs. You notice here there is that beautiful layer of lean over the outside. Very often people will insist on putting meat into the curing vessel with these ribs left on. Take them off, remove them from the middle portion, because they can be used to such better advantage while fresh than where they pass through the curing stage. Befor you trim this up, put it into the curing vessel, take a flat instrument of one kind of another, take a cleaver and flatten it out. In the packing house you probable notice they have a hydraulic press that comes down and straightens out every one of these side pieces, because there are bound to be wrinkles running lengthwise on the outside of that pork carcass from hanging up, and those you want to remove, but don't get the idea that you can remove wrinkles that run

up and down the outside of the hog in that manner. You will find when you have wrinkles running up and down, back of the shoulder, that you cannot get rid of them. You will not only find them on the outside, but when you cut the bacon strip, you will find that there's an unequal distribution of fat and lean and that is the thing that is objectionable. If you want a large amount of bacon, just square up the edges in this manner, take off this lower strip. Now this will all go into the lard and sausage. Here you have the bacon strip neatly trimmed. Leave that in one piece or cut it into two pieces just as you like and put it into the curing vessel. You notice at this end, this flank end, there is not as much lean as there is on this end, consequently the choicest portions of the bacon comes from this part from which the ribs have been removed for premium bacon. Take medium weight hogs and cut the bacon short to about there and this goes for salt pork and that gives you premium bacon that will sell for three or four cents a pound more on the market.

That completes the work of cutting the pork and the beef carcass, and I hope that I have not detained you too long. I don't know what time it is, but I want to thank you for your indulgence and your patience.

A Member: Say a few words in regard to curing.

PROF. TOMHAVE: There are a number of different methods of curing and possibly some of you have a better method than I know of. In brief, first of all, your meat should be thoroughly cooled. That is the first essential.

A Member: It is not desirable to let it freeze?

PROF. TOMHAVE: No. sir, the freezing of meat and keeping it frozen does not injure it, but don't freeze a pork carcass that is to be put away to be cured unless it is necessary. It won't hurt it if you freeze it and keep it frozen until you cut it up and thaw it out and put it into the curing vessel. It is not the best thing for it, but alternate freezing and thawing of meat breaks down the muscle tissue and causes the meat to become flabby. Cool the carcass as rapidly as possible have it firmly set, trim the pieces of meat up as these are trimmed, and it will be ready for the curing vessel. The recipe that we have so many of us used and have found satisfactory, is one made up, 8 to 10 pounds of salt, 2 pounds of brown or granulated sugar and 2 ounces of salt peter for 100 pounds of meat. That, dissolved in 4 gallons of boiling water. I will give it again so that if any of you want to take it down, you can do so. Eight to 10 pounds of barreled salt; 2 pounds of sugar, brown or granulated, and 2 ounces of salt peter. That is the mixture for 100 pounds of meat. This is to be dissolved in 4 gallons of boiling water. That solution is then set away and allowed to cool. In the meantime, take some salt and rub the outside of your meat. Suppose this is a piece you want to cure; take some salt and thoroughly rub it on the outside, so as to draw out any particles of blood that may be near the surface in this meat. Some of you may wonder why we want to use these various ingredients. The use of salt is a means of preserving; that is the reason we use it in such large amount but the action of salt alone on meat has a tendency to harden muscle fiber, and for that

reason we use the sugar. The addition of sugar has a tendency to soften the muscle fiber and besides to give it the sweet taste. The use of the salt peter is not as a preservative; it is a preservative in itself, but we use that very small amount, two ounces for every 100 pounds of meat, as a means of retaining the natural color in that meat. You will find that salt not only has the astringent effect of hardening the muscle fiber, but also removes the natural color of flesh and that is the reason we use the salt peter. We leave it in the liquor five to seven weeks, that is long enough, five to seven weeks, depending on the size of the piece. That is for a brine cure. If you prefer a dry salt cure, we use the same combination except that we don't use as much salt. We use five or six pounds of salt instead of eight to ten, but personally I prefer the pickle cure because it requires less attention after you have put it into the curing vessel. With the dry salt cure you must rub the meat at the end of five or six days. Although it is a quicker method of curing, yet it is not quite as economical as the other method of curing.

A Member: How long do you let it lie to cure it dry?

PROF. TOMHAVE: Two or three weeks; it cures quicker that way than the other.

A Member: Why do you boil the water?

PROF. TOMHAVE: The reason is that any foreign matter that may be in the water coming out of a pump or spring will generally come to the surface and can be skimmed off, and boiled water is more sterile than water directly from the pump. Beside that, you have dissolved your ingredients much quicker than you can in cold water. These are the minor reasons for it.

A Member: Do you put it on the meat while it is hot?

PROF. TOMHAVE: No sir. Always have the solution thoroughly cooled before it goes over the meat. You will find that four gallons of water is enough to cover 10 pounds of meat if thoroughly packed in a barrel or jar. If you do not have the meat thoroughly submerged, add a little more water to it. Put boards over it and a good clean stone and you should have little or no trouble with your meat. and put that vessel in a cool place where it will not freeze or become too warm.

A Member: Does it make any difference in the quality of the meat produced by rather hard feeding?

PROF. TOMHAVE: It depends upon the feeding, of course, and the surroundings. Filthy and undesirable conditions in a small lot would be undesirable as compared to a larger lot with greater freedom and more sanitary conditions, but the quality is based on breeding and feeding rather than environment. If the animal is well taken care of in close quarters, there will be very little difference, so far as quality is concerned, though an animal in the feed lot needs to be taken care of just as much as an animal used for breeding purposes.

A Member: That is what I meant; shouldn't it have exercise?

PROF. TOMHAVE: Yes, exercise has a tendency to do that to some extent, but to what extent we don't know.

MR. STEVENSON: Couldn't you do that by forgetting to feed the hog every other day?

PROF. TOMHAVE: I am afraid not. The hog is like the human person, he wants his meals as regular as you want yours, and for that reason he should have them.

A Member: Does it do any harm to stay in pickle a longer time?

PROF. TOMHAVE: No, it does not. Are there any other questions? If there are no further questions I want to thank you.

The CHAIRMAN: Now, ladies and gentlemen, don't get away, we have got an important announcement here; Secretary Critchfield will make it; it is an announcement in regard to Foot and Mouth Disease.

SECRETARY CRITCHFIELD: I think the announcement to which the Chairman refers is that the meeting of the State Livestock Sanitary Board that convened between four and five o'clock this evening, after I left the audience room, placed a quarantine upon the cattle of all exposed sections of the State of Illinois, for the reason that after we have expended hundreds of thousands of dollars in wiping out, as we believe effectually, the foot and mouth disease from our own State, we are threatened with having another dose of it and it is coming from that direction. Now, is that the announcement?

The CHAIRMAN: Yes; what is the duration of this quarantine?

SECRETARY CRITCHFIELD: Until further notice, until it is lifted.

A Member: I move that the action of the Livestock Sanitary Board be endorsed by this meeting.

Motion seconded.

MR. STEVENSON: I move that we withhold judgment until the courts of Illinois have thoroughly threshed out this question. Let's have fair play; last evening I said "Let's wait before we endorse." I have a letter in my pocket received this morning from Chicago, giving the cause of the action of the State Livestock Sanitary Board. I think they are too hasty. They state that the dairy herd is cured, not a death has occurred from foot and mouth disease among 830 to 840 cattle. One death has been occasioned by milk fever. One bull has died from some glandular trouble, they cannot diagnose it, 28 calves have died. Those are facts to which Mr. Skinner certified. The courts of Illinois have restrained the Federal Bureau from killing some herds of cattle that are reported cured. That is the condition, and I think we are premature in Pennsylvania when we pass judgment over the courts of Illinois. Let us wait and withhold our opinion. Most of us know nothing about the disease. I don't pretend to know anything about it, but I believe the action taken is altogether too hasty and I protest.

The CHAIRMAN: I want to say that the trouble is that it is not hasty enough with Illinois. They have been monkeying around out there until they have got their State infected and now they are trying to infect our State and we don't want to have it done.

MR. STEVENSON: You are too fresh with your quarantine, you are quarantining individuals and not localities. I know where the Federal Bureau permits shipments from certain individuals to other States that are not quarantined, just because of an imaginary line. We should go slow in this matter.

The CHAIRMAN: When a man gets up and confesses that he don't know anything about the subject, we ought not to be swayed by his opinions because we do know something about it.

MR. STEVENSON: I don't think that either of us knows anything about it.

The CHAIRMAN: I beg your pardon, I do know something about it and I don't believe that we ought to be swayed by the opinion of a man who confesses that he don't know anything about it.

A Member: I don't think the gentleman who has just spoken is informed on the matter. I don't think the quarantine put on by the Livestock Sanitary Board has any bearing on the cattle held in quarantine in the State of Illinois on exhibition at the National Dairy Show. I don't think the gentleman is informed that within the last 24 hours there have been cases found in the stockyards of this state traceable directly to the State of Illinois. If we are going to expose the great livestock interests of Pennsylvania and the gentleman on his own admission, states he knows nothing about it—I do, I have seen it, I make it my business as a man interested in livestock to visit herds where they have a disease—if the gentleman has seen any of that disease, he knows something about it and knows what we have to dread. Secretary Critchfield states that the State has spent hundreds of thousands of dollars and I do not think we should open this State to have a disease that will cost millions thrust upon us, when, by such action as the Board has taken, we can safeguard ourselves against it.

MR. STEVENSON: It is possible I have made a mistake, but I received a letter this morning from Chicago which refers to the action of the courts there and I presume, perhaps too much in supposing that the quarantine of Pennsylvania was due to the action of the courts. If it was due to a fresh outbreak that I have not heard of, I beg your pardon.

The CHAIRMAN: The Pittsburgh stockyards have now been cleaned up; for the first time, it cost $13,000 to clean them up. Do you know, Dr. Staley, what it cost the second time?

DR. STALEY: Close to $3,000. We had seven outbreaks from sections outside of Pennsylvania. Certainly it is time we stopped those.

MR. STEVENSON: Am I correctly informed that the present action is due to a new infection?

DR. STALEY: Yes, due to actual cases brought into this State from without; it has nothing to do with the action of the Illinois courts.

MR. STEVENSON: Then I beg your pardon and withdraw my objection.

DR. STALEY: We have no diseased herd standing above the ground and have made no interference with individuals.

MR. STEVENSON: In conversation with Mr. Bayard to-day, he threatened that they would quarantine on account of the action of the courts.

The CHAIRMAN: No sir, I did not.

SECRETARY CRITCHFIELD: The State Livestock Sanitary Board has no knowledge of any action taken in Illinois. Some individual may have known about it, but I did not know about it, but I felt that the action taken by our Board was a very proper thing to do to safeguard the interests of the stockmen of my own State; that is what we are created for.

The CHAIRMAN: There's a bunch of cattle men in one section of Illinois, as you know, and you all know what they are. They are the men that got out this court case in Illinois. The Federal Government quarantined against that particular locality some time ago, on account of the tuberculosis matter. These cattle men in Illinois got out that injunction. The Attorney General of Illinois did not contest that injunction and the court continued the injunction on the ground that the Attorney General did not contest it. The Attorney General notified the court that he would not respect that injunction, that the court had no power to review the Executive acts, no legal power to review the acts of the Executive, and that this matter in Illinois was a matter for the Executive. But the Federal Government notified them that they would respect the injunction. Now that is the standing of the case in Illinois. It is not heard, has never been heard; the court has not decided anything in Illinois; the preliminary injunction is merely contingent, the court has not heard or decided the case. Now then, gentlemen, I hope that this vote will be unanimous in support of health, animal health, in Pennsylvania. Let's make it unanimous, Mr. Stevenson, you want that as much as any of us.

MR. STEVENSON: I don't want any re-infection or new outbreak of the disease, but I want to see that one inspection carried to a finish so that we may know something about it.

The CHAIRMAN: Let them carry it. Let's have a rising vote of approval of our Board in putting on this quarantine against the infected section of Illinois. All in favor of it, stand up. Anybody that wants to vote against it, stand up. Well, there's nobody got the nerve to vote against it anyhow.

SECRETARY CRITCHFIELD: I wish, through the Chair, in behalf of the State Livestock Sanitary Board, to say that we appreciate this very much. We have been in a very hard position; you know

there are always some people that will complain; I don't know but what they'd complain if they were going to be hanged; and we have got a great many of that class to deal with, and yet we have got to do the best we can to protect the interests of our own State. This is certainly very encouraging to me personally and I know it will be to the entire membership of the State Livestock Sanitary Board. We appreciate it more than I can express.

A Member: I understand there is another safeguard of the finances of this State covered by the action of the Livestock Sanitary Board, that is, in future they will not pay for any cattle brought from outside the State that develop the disease after they are inside the State.

SECRETARY CRITCHFIELD: That is correct, sir.

The CHAIRMAN: You mean that cattle brought from outside the State and infected there, will not be paid for?

SECRETARY CRITCHFIELD: Cattle that develop the disease after they come here, will not be paid for by the State of Pennsylvania.

A Member: If they are going to take that position, we can't raise cattle here. We expect to get our cattle from Western states; they may come here and the purchaser may buy them innocently, not knowing they are infected. They may be infected before they come here, and if they develop the disease here and the purchaser gets no money, he'd rather risk his money in buying feeding cattle.

The CHAIRMAN: That applies merely to infected territory. The feeder here cannot buy cattle in infected territory, anyhow. There is no danger of your getting them, because they won't let you bring them in anyhow.

DR. STALEY: It applies to the northern part of Illinois, under Federal quarantine.

The CHAIRMAN: Then territory that is cleaned up, that will not apply to, of course.

A Member: This gentlemen here said, "Hereafter." That means in years to come.

The CHAIRMAN: He didn't mean that. He hopes that the whole thing will be cleaned up soon, anyway. To-morrow afternoon there is going to be a free for all discussion of this foot and mouth business, and you are all going to have a chance to be heard, and you can come there and we will have an experience meeting. We have all had some experiences that are pathetic and disastrous. I have never felt sorrier in my life than I have felt for some people in this foot and mouth epidemic, some of the most pathetic cases you ever heard of. Let's come here to-morrow with the idea of getting into the facts and I hope these gentlemen who have never seen a case and have ideas that those of us who have been helping to kill the cattle and seen the cases—I hope they will come here with an open mind and take our words rather than the printed word of somebody else who has never seen a case, and I believe they will do that and that

we will all learn something if we will come here to-morrow afternoon. I believe that meeting is in the room below, among the Breeders and Dairymen. Let us have a good, free for all discussion of this matter. Are there any other announcements? At 12.30 to-morrow, in this hall the Berkshire Breeders of Pennsylvania will meet. The Jersey Breeders are requested to meet in one of the rooms downstairs at 11 o'clock to-morrow.

MR. STEVENSON: The Holstein Breeders met this afternoon and finished up their business.

The CHAIRMAN: Are there any other announcements?

A Member: The Sheep Breeders of Pennsylvania will meet in this hall to-morrow afternoon, following the meeting of the Berkshire Breeders Association.

The CHAIRMAN: We want a State Sheep Breeders' Organization to get rid of some of these dogs.

There being no further business, the meeting then adjourned.

Thursday Morning, January 28, 1915.

The meeting of the Pennsylvania State Board of Agriculture was called to order in the Board of Trade Building, Harrisburg, Pa., at nine A. M., Vice-President DeWitt in the Chair.

The CHAIRMAN: Gentlemen of the State Board of Agriculture, will you please come to order?

The SECRETARY: Mr. Chairman, before proceeding to the regular program, I wish to offer a motion, by request of Mr. Shoener, a member of the Board. I move you, sir, that Mr. Joseph Beckler be admitted to a seat in council with us, with the privileges of the floor, as a delegate from the Agricultural and Horticultural Association of Schuylkill County.

The motion was seconded and adopted.

The SECRETARY: When the report of the Committee or the Specialists on Forests and Forestry was called for, there was no answer. Miss Dock's report has been handed to me and I move that it be printed with the proceedings of the meeting.

The motion was seconded and adopted and the report was submitted, as follows:

REPORT ON FORESTS AND FORESTRY

By MIRA C. DOCK.

Owing to the very recent date of my appointment to this honorable Board, I ask your permission, to accept from me instead of a report, a memorandum on projected work, which I hope will receive not only approval, but valuable suggestions from the Board.

The memorandum relates to both general and special means of reforesting waste farm lands and hilly woodlands in our State. Every one who travels considerably in our State has doubtless observed the increased extent of cut-over hill lands, as for instance the north and south boundaries of the Chester Valley, and other rich agricultural valleys; the increased number of washed and gullied fields in the rolling farm lands of Dauphin, Northumberland, Huntingdon and other central counties, and also the vast destruction by means of sleet, storms and floods in recent years, of trees bordering streams. The general work for which I ask your approval is active co-operation with the State Department of Forestry in promoting a movement for extensive and general re-forestation of private woodlands under the provisions of the Auxilliary Forest Act of 1913, copies of which are appended:

No. 269.

AN ACT

To provide for the assessment and taxation of auxiliary forest reserves, and the collection, distribution and use of the taxes collected therefrom.

Section 1. Be it enacted, &c., That all surface lands which may hereafter be classified and set apart as auxiliary forest reserves, in the manner provided by law, shall be rated in value, for the purpose of taxation, not in excess of one dollar ($1.00) per acre and shall continue to be so rated so long as the said land remains within the class designated as auxiliary forest reserves: Provided, however, That if the said surface land be underlaid with coal, iron ore, oil, gas, or other valuable minerals, said minerals may be separately assessed. The assessors in the several districts in which such lands are situate shall assess such lands in the manner now or hereafter provided for the assessment of real estate for purposes of taxation, as if they had not been set apart as auxiliary forest reserves, and shall make their returns to the county commissioners in like manner as is now or hereafter may be provided by law, subject to exception, appeal, and final adjustment.

Section 2. Upon receipt of assessment returns from the various assessors, the county commissioners shall reduce, in their records, to a sum not in excess of one dollar ($1.00) per acre, the assessment on all those lands which shall have been placed in the class known as auxiliary forest reserves, in accordance with certificates filed with

them by the State Forestry Reservation Commission, and the original assessment returns made by said assessors shall be preserved.

Section 3. Whenever timber, on land which is included in the class of land known as auxiliary forest reserves, is about to be harvested, the then owner of the timber on said land shall give a bond to the county treasurer in twenty per centum of the amount of the estimated value of the timber to be harvested, and to be approved by the court of the county, conditioned to pay to the county treasurer, within ninety days after harvesting, ten per centum of the value of the trees immediately at and before the time of harvesting; which amount shall be ascertained by statement and return, under oath or affirmation, furnished in triplicate one to the county commissioners, one to the county treasurer, and one to the commission, immediately after harvesting, by the then owner of the land, setting forth said value; which sum thus paid shall be divided and distributed by the county treasurer of each county—to the county, and to the poor district, the road district, and the school district of the township in which the auxiliary reserve is situate, pro rata, based upon the last assessed millage of taxation for county, poor, road, and school purposes within said taxing district.

Such sum of money when ascertained to be due as a tax by the filing of the foregoing statement and return, under oath, and, as hereinbefore provided, directed to be paid to the county treasurer by the owner of an auxiliary forest reserve, shall, from the time of such filing, be and remain a lien upon the land of such owner until payment shall have been made: And be it further provided, That all moneys received by the boards of supervisors shall be appropriated exclusively to the opening, maintenance, and repair of the public roads now or hereafter passing through or into said auxiliary forest reserves, or upon which said reserves now or hereafter may abut; and, in the event that no public highways pass through or into said reserves, or none of said reserves abut on such highways, then said moneys shall be used for general township road purposes.

Section 4. Should the county commissioners be dissatisfied with the return made, as hereinbefore provided in section three thereof, the court of common pleas of the proper county, on petition of the commissioners, shall appoint a board of three appraisers, who shall go upon the land in question, estimate the quantity and value of the trees immediately at and before the time of harvesting, and make a return thereof to the court, which said return shall then be made the basis upon which each owner shall make payment to the respective county treasurers, unless changed upon appeal. The said appraisers shall be duly sworn or affirmed before entering upon their work, and either party, if dissatisfied with the report of the appraisers, shall have right of appeal to the court of common pleas of the county, within ten days after such report shall be filed and notice thereof given the owner. The said appraisers shall be allowed their expenses and a compensation to be fixed by the court, both to be paid by the county commissioners.

Section 5. In case of the removal of said lands from the class known as auxiliary forest reserves, prior to the maturity of the timber, and without payment of the tax of ten per centum of the value thereof, as provided in section three of this act, the county

commissioners shall, on notice from the commission, ascertain the amount of the taxes which would have been paid by the said owner on the original assessment, before the reduction provided for in section two of this act, adding legal interest from the date when each tax payment would have become delinquent. The said commissioners shall likewise ascertain the amount of taxes which have actually been paid upon the land in question, adding legal interest upon all such payments from the date when paid, and certify the result thereof to the county treasurer, who shall then proceed, in the manner provided for the collection of county taxes under general laws, to recover from such owner the difference between the two amounts, with costs. Such difference, so ascertained to be due as tax as aforesaid, shall be and remain a lien upon the land of such owner until payment shall have been made.

If such land shall be so removed from said class after the due cutting of a matured crop and the payment of tax thereon, the owner shall, in that case, not be liable for such past assessment but the land shall thereafter be liable to assessment and tax as all other land not classed as auxiliary forest reserves.

Section 6. This act shall take effect only beginning with assessments made for the purpose of levying taxes for the fiscal year one thousand nine hundred and fourteen.

Approved—The 5th day of June, A. D. 1913.

No. 270.

AN ACT

Providing a fixed charge on land classified as auxiliary forest reserves; and the distribution of the fund thus set aside for school and road purposes.

Whereas, By existing law the State forest reserves are subject to an annual charge of two cents per acre for the benefit of schools, and two cents per acre for the benefit of roads, in the respective districts in which said reserves are located; and

Whereas, It would be a hardship to withhold from school and road districts the taxes which would otherwise be collected from land classified as auxiliary forest reserves; therefore,—

Section 1. Be it enacted, &c., That all lands which shall hereafter be classified as auxiliary forest reserves shall be subject to an annual charge of two cents per acre for the benefit of the schools, and two cents per acre for the benefit of the roads, in the respective districts in which said reserves are located. Said charge is hereby made payable by the State.

Section 2. The State Forestry Reservation Commission shall certify to the respective school districts and road districts, throughout the Commonwealth, in which auxiliary forest reserves are located, the number of acres thus set apart and classified in each district, and the charge against the same; and shall, furthermore, certify to the State Treasurer the number of acres as aforesaid, and the charge against the same, in favor of the respective school and road districts. The State Treasurer shall, upon the approval of the proper warrants

of the commission, pay to the several school districts and road districts the amount due the same from the Commonwealth, as derived under this act.

Approved—The 5th day of June, A. D. 1913.

No. 284.

AN ACT

To classify certain surface lands as auxiliary forest reserves; to prescribe the terms and conditions for their continuance in said classification, or their withdrawal therefrom; and to provide for the expenses attendant thereon.

Section 1. Be it enacted, &c., That in order to encourage the growing of such trees, now existing or hereafter produced, as will at the proper age be suitable for merchantable forest products, whether such be of natural reproduction or from seed sown, or trees planted out, or all combined, all surface land which may be set apart according to the provisions of this act, and exclusively used for growing such trees, is hereby constituted a separate and distinct class of land, to be known as auxiliary forest reserves.

Section 2. When any owner of surface land desires to have such land placed in the class established by section one of this act, such owner shall notify the State Forestry Reservation Commission of his desire in manner and form to be prescribed by said commission. Said notice shall contain a description of the land, its location, boundary, area, and character, and shall state as far as practicable the species, character, and condition of the trees growing thereon, and whether they are of natural reproduction or are from seed sown for the purpose, or have been set out of said land, or all combined, and such other information as the commission may require. If, upon receipt and consideration of this notice, the commission shall, in its discretion, deem the conditions such as to warrant action on its part to determine whether such land should rightfully be placed in the class established by section one of this act, it shall cause the same to be examined by some person learned in the practice and principles of forestry, and a report made thereon, and if, upon receipt and consideration of such report, it decides that such land should be placed in the class established by section one of this act, it shall so declare and certify to the commissioners of the county in which said land is located.

Section 3. Upon receipt by the county commissioners of such certificate of the commission it shall be their duty at once to place said surface land in the class established by section one of this act, and keep the same therein until the trees growing thereon shall, in the judgment of the commission, become sufficiently large and suitable for merchantable forest products, or the land be devoted to other purposes: Provided, however, That the certificate of the commission shall not become operative to place said surface land in the class established by section one of this act until the owner of said surface land has agreed, in writing, with the commission to care for the trees growing thereon, according to the instructions and directions of the commission, up to such time as such trees become suit-

able for merchantable forest products; and if any such owner at any time fails to care for the trees growing on said land as agreed with the commission, and due proof thereof is made, the commission may remove said surface land from the class established by section one of this act. In case of such removal, either through failure of the owner to care for the trees or on his expressed desire for removal before the trees shall have been cut at maturity and tax paid thereon, the county commissioners shall, on notice from the commission, proceed to recover from said owner, for the use of the county and township, by an appropriate action at law if necessary, the difference in the amount of tax which would have been paid by the said owner at the rates established for the years for which recovery is sought and the rate provided for auxiliary forest reserves, with costs of suit, to be recoverable from the time when such land was placed in the class of auxiliary forest reserves. And the commission shall remove said surface land from the class established by section one of this act at any time that the then owner shall, in writing, notify the commission that he desires such removal. The commission may, in its discretion, at the time said surface land is placed in the class established by section one of this act, require the owner to file with the commission his or its bond, of such kind and amount as the commission shall deem reasonable and sufficient to secure the obligations of such owner under this act.

Section 4. Whenever trees growing on said surface land have become suitable for merchantable forest products, the commission shall, at the request of the owner or on its own motion, make an examination of said land, and designate for the owner the kind and number of trees most suitable to be cut, if, in the judgment of the commission, there be any, and the cutting and removal of said trees so designated shall be in accordance with the instructions of the commission.

Section 5. If the owner of said surface land faithfully carries out the instructions of the commission with regard to the removal and marketing of such mature or other trees, as may be designated in the instructions of the said commission, and shall immediately replant other trees of valuable species, or so protect the young growth that the said land may immediately become covered with young forest growth, and does so with the approval of the commission, then such surface land shall remain in the said class, established by section one of this act; otherwise, the commission shall notify the county commissioners that the said land is not being maintained in accordance with the written agreement of the owner and the instructions of the commission, in which event the county commissioners shall immediately remove said land from the class established by section one of this act. All expenses attendant upon the examination of the said surface land by the commission shall be paid for out of the moneys appropriated for the maintenance of the Department of Forestry, in like manner as other expenses for maintenance of said department are now paid.

Section 6. The owner of the said auxiliary forest reserves shall, at all times, have the right to remove therefrom trees, or portions of trees, which may be killed by fire, thrown or broken by the wind, or injured by other natural causes; and shall, under the direction of

the commission, be privileged to make necessary thinnings or removal of undesirable species of trees, in order to improve the condition of the remaining trees; and, under the same direction, may be privileged to remove therefrom such timber, from time to time, as may be necessary and essential for use upon the neighboring cleared lands of the said owner, for general farm purposes.

Section 7. Any tract of land while remaining in the class of auxiliary forest reserves as above provided, may, nevertheless, be sold or incumbered by or through the owner thereof, but no sale or incumberance, whether voluntary by the owner or involuntary under any statutory or judicial proceeding whatsoever, whether of any State or of the United States, shall effect a discharge of any obligation imposed under this act, and said land shall be removed from said class only in accordance with the provisions hereof.

Section 8. That all acts or parts of acts inconsistent herewith be and the same are hereby repealed.

Approved—The 5th day of June, A. D. 1913.

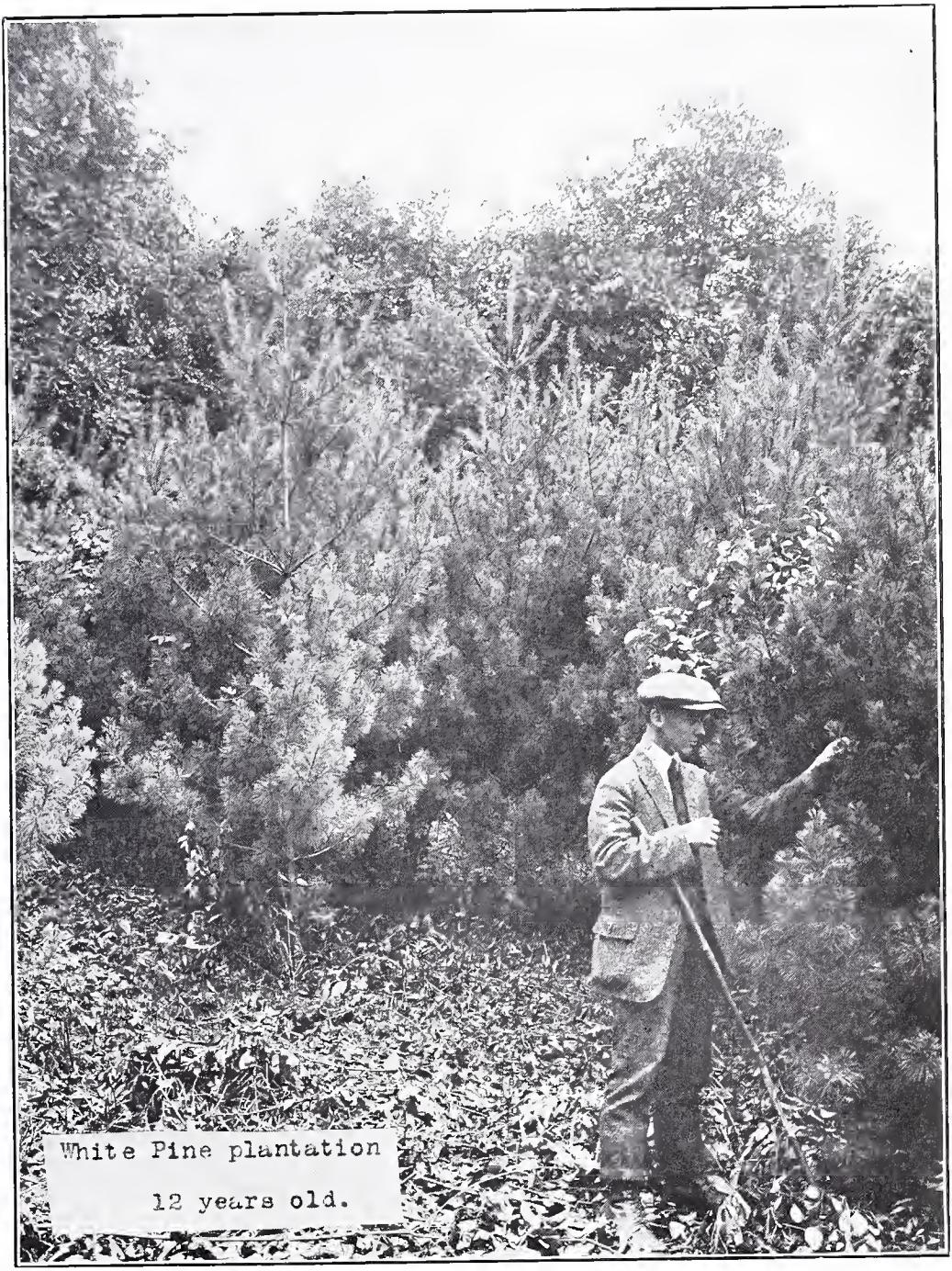
These Acts relate more especially to tracts of considerable extent, such as the hills mentioned above, from which, as a rule, all valuable kinds of timber have been removed, and which, in many instances, are decreasing in value from lack of care, which adoption of the Forest Acts would insure them.

The special form of re-planting, for which I ask your approval and suggestions as to how a movement can be urged forward, is the planting of nut trees, either hickory or walnut, on lands adapted to them, of white oak and ash on stream borders, and of red and rock oak, especially the latter, on the rocky hill-fields of many, indeed, most portions of our State. Fine examples of the rapidity of walnut growth can be seen on the Fox Estate, Clarion county; along Penn's Creek, near Glen Iron, Union county; of ash, growths of four feet per annum have been noted at Asoph, Tioga county. The growth of hickory is slow everywhere, but because it is slow we should plant it all the sooner. Red and white oak grow very rapidly in some localities, and rock oak on the dry soil of steep hills in Adams county grows like a weed in height. I am indebted to the Hon. S. B. Elliott for the exhibit of a plantation of Norway Spruce planted by him in 1867, and which in 1903, at the age of 36 years were 65 feet high. I have seen these trees and they are now really monumental in size. Another exhibit is a white pine grove of trees now 6 to 12 feet high raised by me from seed gathered in 1901; they are good but not extraordinary. The third photo is of Colorado Blue Spruce, with white ash in the background in one of my own nursery rows. These trees are raised for experiment, and from my own experience, I urge every one who lives in the country to start this spring to raise their own trees, with which to improve with valuable species some now worthless corner of their woods, or to bring variety and a new interest into their planting. But that we shall all co-operate earnestly to promote a re-foresting movement in our State is my earnest hope. We have the land and the machinery and all we need is the will to do.

The CHAIRMAN: Gentlemen of the State Board of Agriculture I thank you very much for conferring upon me the privilege of pre-

Norway Spruce. Planted by Hon. S. B. Elliott in 1867. Plants three years old. Mansfield, Tioga Co. Photo April 8, 1903. Trees then 65 ft. high.

White ash to rear of Colorado blue spruce, Home-raised.



White Pine plantation

12 years old.

siding at this meeting. We are farmers; we are here for the best interests of agriculture; let us not forget that. We may differ in our opinions as to what may be best, but if we differ honestly and candidly, good will prevail from all our differences. The next thing on the program this morning is the report on Soils and Crops, by Prof. Franklin Menges, of York, Penna.

Prof. Menges submitted the following report:

REPORT ON SOILS AND CROPS

By PROF. FRANKLIN MENGES

This is a new departure with the State Board of Agriculture. We have had reports on well nigh all agricultural and allied subjects, but so far as I have been able to learn, never a report on soils, climatic and crop adaptations.

The State of Pennsylvania has as varied soil and climatic conditions as any of the Eastern states. The southeastern part, more especially the counties east of the South Mountain, with an elevation nowhere about six hundred feet above tide, have a growing season ranging between the last killing frost in the spring and the first killing frost in the fall of 200 days, while in the same altitude, on Somerset county, at an elevation of 2,200 feet, the season between killing frosts averages only approximately half that of the southeastern section; and west of these high elevations in Fayette, Westmoreland, Washington and Greene counties the growing season is approximately one-third to one-half longer than on the high plateau of the Allegheny Mountains. With these shortened seasons, the crops raised in Somerset county and the crop rotations followed are very similar to those of the southeastern and the areas west of the Alleghenies.

The question at once arises, Is this practice the best or is it justifiable and will it bring the best results, or can we utilize crops better adapted for these higher elevations and cooler climate and can we devise a rotation of crops by means of which advantage can be taken not only of the season between killing frosts of hot weather plants and the season when plant juices of cool weather plants no longer freeze in the spring and until they begin to freeze in the fall and all growth stops? Plant growth is nothing more than the storing up of sunlight, and there are varieties of plants which can store up sunlight during cool and even frosty weather or until the plant juices freeze, while others cannot endure cool nights, the plant juices of which congeal and are permanently injured by the lightest frost. All the varieties of wheat, winter and spring rye, oats, barley, spelts, are cool weather cereals, while all the varieties of corn and the sorghum are hot weather cereals. Red alsike, crimson, sweet, white and numerous other clovers, together with some varieties of alfalfa, Canada field peas and a large variety of other peas, and some beans, are cool weather legumes, while mammoth clover, some varieties of alfalfa, the various varieties of cowpeas, soy or soja beans, belong to

the warm and hot weather legumes. In many of the sections referred to both the cool and hot weather cereals and the cool and hot weather legumes are indiscriminately raised.

As previously stated, plant growth is a process of a storing sunlight and the farmer, therefore, through the agencies of the plants he raises, is a storer up of sunlight in such a condition that it will furnish the largest amount of the most available human nutrition; and the question will ere long be, What plants will furnish the highly available human nutrition in the largest quantity under the varied climatic and soil conditions. Wheat and corn are first among the cereal grains as gatherers and storers of large amount of available human nutrition containing, especially wheat, all the elements of nourishment required by the human body, the former a cool weather crop which starts its growth in the fall of the year at a season when corn will no longer grow, and starts in the spring, weeks and sometimes months before corn is planted, in fact develops and ripens a crop by the time corn gets well started. A climate in which the temperature during the season of stalk and grain development ranges from 65 degress—80 degrees Fahrenheit, with an amount of moisture that will produce not a luxuriant, weak, sappy stalk but a stiff stemmed, strong one is the most favorable for the production of large yields of high milling quality wheat which will make a large quantity of flour of a fine bread making character, while the temperature most favorable for the development of a stalk that will produce and ripen the largest yields of corn, ranges from 80 degrees to 98 degrees Fahrenheit during the greater parts of the months of the middle of June, July and August, with a rainfall of from six to eight inches during this period, is the most favorable for the production of large yields of high feeding quality of corn. The luxuriant growth of stalk in which too much energy is put into straw and not enough into grain is usually due to too much rain and sunshine, or at any rate, too much moisture and a temperature at which stalk growth can go on, which is the case in the higher elevations of Somerset county, with favorable cool climate but with an excessive rainfall reaching 55 inches during the year because of which the rain accomplishes what the heat and moisture do in other sections.

But soil conditions favorable for the production of a superior wheat are equally as important as climatic. The warm early farmings, sandy loams and loamy soils derived from the Potsdam sand and micaceous rock of the South Mountains also produce large yields of high milling quality wheat, because these soils are warm with no excess of rainfall and not an excessive water holding capacity. Plant growth begins early and the wheat plant is grown and the grain developed during the cooler days of early June and ripened during the middle of this month, while in the cooler loams, clay loams, and clay of Cambrian limestone origin, a luxuriant straw growth is made, the grain developed later and ripended during the latter part of June and early July and an inferior milling quality wheat produced by soil types that will yield a superior quality of corn, an illustration of soil and climatic adaptation for different cereals.

Bradford, Tioga, Susquehanna and Wayne counties have similar climatic conditions as those prevailing on the elevated areas of

Somerset county with a smaller amount of rainfall which makes conditions here more favorable for raising the cool weather cereals, such as wheat, than Somerset county, a crop which formerly was grown in these counties and which with the right agricultural methods could at this time be successfully raised and it seems should be raised because of its value as human food. But oats is without question the best adapted cereal for these northern and higher elevated areas especially where the rainfall exceeds 40 inches and where this cereal can, with right agricultural methods, be made to yield from 50 to 70 bushels per acre it should occupy the leading or advantageous position in the rotation because such a yield can likely be made to produce a larger amount of human food by converting it into milk and butter than the average wheat crop would.

The areas between the northern and these higher elevations on the Allegheny plateau and north and west of the southeastern section, including the following counties: Franklin, Cumberland, Fulton, Bedford, Perry, Huntingdon, Mifflin, Juniata, Snyder, Union, Montour, Northumberland, Columbia, Lycoming, Clinton, Center and Blair. Wherever the soils are derived from the limestone, the shaly limestone, the shaly Hudson River exposures, the limy Clinton shales, the Salina limy shale, the lower Helderberg limestone, the limy Marcellus, with a few areas of the Chemungs, are agriculturally among the best combined corn and wheat growing soils anywhere in the State. The agricultural soils derived from the sandy strata of the Hudson River, the Clinton, the Chemung and the Catskill formations are among the late fall or warm early spring farming soils, many of which can be plowed wet without injury and prepared early and planted with crops which will ripen during the early summer so that here late fall sown, early summer ripening crops can be raised, followed with a dry weather soil improving crop to be followed again in the fall with an early summer ripening crop so that in these poorer soils rotations can be arranged that soil improving crops can be made to follow or be raised with soil exhausting crops.

If, therefore, in these poorer soils a combination of soil improving and soil exhausting crops such as have previously been enumerated and adapted to dry and wet soils, hot, warm and cool climatic conditions can be put into rotations so that it will accomplish what all rotations should, namely, produce the largest quantity of human food while at the same time the productive capacity of the soil is increased, then certainly in the more fertile areas in all sections of the State these soil improving and soil exhausting crops can be combined that so far as crops can improve soils, which according to my opinion are the greatest factors in soil improvement, a great step will have been taken toward a permanent agriculture in Pennsylvania.

The CHAIRMAN: Gentlemen, what will we do with the report?

PROF. MENGES: Mr. Chairman, I wish they'd discuss it.

The SECRETARY: I move that the report be adopted and published with the proceedings of the meeting.

The motion seconded and carried.

The CHAIRMAN: Next on the program is the report on Insecticides, by J. D. Herr, of Lancaster, Pa.

Mr. Herr then presented the following report:

REPORT ON INSECTICIDES

By J. D. HERR, *Lancaster, Pa.*

The term insecticides is used to designate that class of substances which are known to react fatally upon insects. Of these substances, standard works upon the subject treat upwards of 150 separate chemical compounds and many times this number of formulae, not including secret or proprietary preparations, as being useful in combating injurious insects. There are no doubt others still which would also be effective for this purpose, but the expense of using them on any large scale would be prohibitive. A very small fraction of these substances will be embraced in this report for the reason that my time does not permit of even a brief mention of the relative merits of a large number, neither is this necessary, for, as a matter of fact, only a few are available for use in a commercial way, for, any chemical substance to be utilized in the struggle against parasitic insects ought to respond to the following different requirements: (1) To destroy the parasite or arrest their evolution in the least possible time. (2) To poison the parasite without at the same time injuring the host plant and to preserve its properties for some time. (3) To be cheap so that their use on a large scale will be economical and profitable.

Of the substances available there are less than a dozen possessing these qualities, but by the use of these man is fairly well armed in his combat with insects for the possession of the fruits of the earth. Of these substances the following nine in number are used in 98 per cent. of the operations directed against insects: (1) Paris green; (2) Arsenate of lead; (3) Bordeaux-arsenates; (4) Lime-sulphur solution; (5) Soap; (6) Emulsified oils; (7) Tobacco; (8) Hydrocyanic acid gas; (9) Carbon bisulfide gas. It is but the truth to state in this connection that there still are a number of insect pests which the combined wisdom and ingenuity of the most learned entomologists and chemists have as yet been unable to control.

HOW INSECTICIDES ACT

Insects are destroyed either by means of internal poisons applied to the parts on which they feed so that the poison is ingested with their food, or by materials which kill by their action on the external surface of the insect. The nature and habits of each insect therefore determine the agent to be used in controlling it. Mandibulate or biting insects are combated by the use of stomach poisons while haustate or sucking insects are destroyed by caustic or gaseous substances.

PARIS GREEN

Pure Paris green is composed of copper oxide, acetic acide and arsenious oxid, chemically combined as aceto-arsenite. Commercial grades often contain many impurities, but the National Insecticide law of 1910 as well as our own State law, stipulates that Paris green must contain, as its active agent, at least 50 per cent. of arsenious oxid of which not more than $3\frac{1}{2}$ per cent. is in water soluble form. As early as 1872 Paris green was used against caterpillars and in 1878 it was first applied on apple trees against the codling moth. Soon after this date it became recognized as the most efficient treatment for phytophagous insects.

In 1896 over 2000 tons of this material were consumed in the United States, by far the greater portion of which was used on potatoes to kill the Colorado potato beetle. It is still largely used in the potato field applied in the dry state either pure or with a dilutent, by means of bellows early in the morning while the foliage is wet with dew. It does not, however, lend itself so well to use with liquids as it settles to the bottom of the spray tank and violent agitation is necessary to keep it in suspension so as to insure an even application. Moreover it does not stick very well to the foliage, being easily washed off by the rain so that repeated applications may be necessary to get the desired results. The high percentage of soluble arsenic in its composition makes it liable to injure the foliage especially when added to solutions containing copper, soap, or ferric chloride. For these reasons its use on fruit trees has been replaced by the safer and more adhesive arsenate of lead, and even on vegetables and field crops, arsenate of lead seems to be preferred by the grower.

ARSENATE OF LEAD

It is only in recent years that arsenate of lead has come into use as an insecticide. In 1893 Mr. F. C. Moulton, while working for the Gypsy Moth Commission of Massachusetts, first suggested its use in the extermination of the gypsy moth to replace Paris green, which could not be applied at sufficient strength to kill these caterpillars without seriously injuring the foliage. It was found that lead arsenate was entirely satisfactory and it has been the standard arsenical insecticide since that time. It possesses important advantages over Paris green, of which are the following: (1) It is not so injurious to the foliage on account of its being less soluble. (2) When sprayed upon leaves and fruits, it forms a thin film which is quite adhesive, often remaining on the plant throughout the entire growing season. (3) It remains in suspension better, requiring less agitation to insure even and uniform application. (4) It can be mixed with copper and lime-sulphur solutions without injury to foilage. (5) It forms a white, visible coating where it has been applied.

Chemically, lead arsenate may be either triplumbic or plumbic hydrogen arsenate. The triplumbic arsenate of lead is prepared by combining normal sodium arsenate with either lead acetate or lead nitrate. If any disodium arsenate is present there is then formed some plumbic hydrogen arsenate. The commercial product usually

consists of a mixture of these two forms, the proportion depending on the purety of the raw materials and method of manufacture employed. Arsenate of lead is usually sold in the form of a thick paste but recently the dry powdered form has been put on the market. The National Insecticide Act of 1910 stipulated that arsenate of lead paste must contain at least 12½ per cent. of arsenic acid, of which not more than ¾ of 1 per cent. is soluble and the water content not to exceed 50 per cent. The best grades of lead arsenate contain a somewhat higher percentage of active arsenic oxid than provided for in this law, and these pastes are usually in a finely divided physical condition so as to be readily mixed with water and remain in suspension for a considerable time. The arsenate of lead powder is double the strength in arsenic oxid as the paste so that only one-half the amount by weight of powder is necessary to use. If the powder is fine enough to remain in suspension in water, it gives practically the same results as the paste. Otherwise the paste is to be preferred.

BORDEAUX-ARSENATES

It is well known, in pest warfare, that very often at the time arsenical sprays are applied to kill insects, certain fungicides also are indicated, and for a number of years it has been the custom with the grower to combine the arsenical with Bordeaux mixture, the most widely used fungicide, thus applying two agents at one operation. The commercial houses were quick to see the advantage of putting on the market a dual purpose spray in concentrated form, accurately compounded, which was ready for use and would require no expert to mix. This has resulted in numerous brands of combined insecticides and fungicides sold under various trade names, many of them at exhorbitant prices. The active constituents of all these is none other than arsenate of lead paste and Bordeaux mixture paste, the latter of which consists of copper hydrate and calcium sulphate. When manufactured under the supervision of efficient chemists these preparations are ideal for use when a double purpose spray is indicated, especially on potatoes and garden and truck crops generally.

LIME-SULPHUR SOLUTION

The lime-sulphur-salt, or so called California wash, was originally developed as a dip for the control of scab on sheep. It was first used as an insecticide on fruit trees in 1886 at Fresno, California. In the east the first orchard trees were sprayed with lime-sulphur-salt solution in 1894 with negative results, and it was not until the year 1900 when Prof. Marlett, of the U. S. Bureau of Entomology, used it under favorable weather conditions and secured excellent results. Since that time the use of lime-sulphur washes under various formulae, with and without the salt as an ingredient has spread over the entire United States until now in point of tonnage it exceeds all other insecticides combined. It is recognized as a specific against all scale insects with the exception of the Lecanium scales and is perfectly harmless to trees of all classes during the dormant state.

Just as the salt which was originally added to this mixture was eliminated because it lacked insecticidal virtue, so also the excess of lime in the original formulae was reduced to more nearly the quantity which would combine with the sulphur in the boiling process in order to reduce the amount of sediment or sludge in the finished product until at the present time the demand among consumers is for a strictly clear filtered solution which will run readily through the nozzle of the spray pump without clogging and more intimately coat the infested surface of the trees. While the services of a trained chemist are not required to mix and boil say 100 pounds of sulphur with 50 pounds of lime in 50 gallons of water, it seems the majority of growers prefer to purchase the concentrated lime-sulphur solution from the commercial manufacturers who are prepared to secure a uniform strength which may be diluted with a given proportion of water at the time of spraying.

The chemical re-action taking place in the manufacture of lime-sulphur is really an intricate matter, and the object of the manufacturer is to obtain polysulphides-tetra sulphide and pent-asulphide of calcium—and thiosulphate of calcium, in the highest possible per cent, as these are the only ingredients in lime-sulphur having any insecticidal value. These can be determined only by means of a chemical analysis and are not always indicated by the hydrometer test. There are on the market many brands of concentrated lime-sulphur solution, analyzing anywhere from 27 per cent. to 33 per cent. calcium poly-sulphides and 1 per cent. to 3 per cent. calcium thiosulphate.

SOAP

Soap solutions are useful insecticides for killing plant lice and other small, soft bodied insects. The so-called whale oil or fish oil soaps are usually recommended for this use. Many of the commercial brands on the market contain impurities as they are usually by-products from the manufacture of other materials, and so are very likely to injure young tender foliage. An excellent fish oil soap can be made after the following formula:

Caustic soda,	6 pounds.
Water,	½ gallon.
Fish oil,	22 pounds.

Dissolve the caustic in the water, add the fish oil and stir briskly for 15 or 20 minutes. Soaps are useful not only for their direct effects upon insects but also by increasing the efficiency of other sprays. Three to five pounds added to 100 gallons of arsenate of lead spray liquid, will tend to prevent settling and the same amount added to nicotine solution will increase its sticking and spreading qualities.

EMULSIFIED OILS

Emulsions are oily sprays in which the minute globules of the oil used are suspended in water, a condition brought about by the addition of soap. Kerosene emulsion is one of the oldest of our contract insecticides. The action of these oils when applied on the insect is

to cover them with a hermetically sealed film which produces suffocation. To this action the soap in the emulsion also contributes. The usual formula for making kerosene emulsion is soap ½ pound, dissolved in one gallon of hot water into which is stirred two gallons of kerosene. This stock solution contains about 66⅔ per cent. kerosene. Using this as a basis any per cent. strength of oil desired in the spray, may be applied. Commercial miscible oils are made of petroleum oils in much the same way as kerosene emulsions, except that phenols are added and vegetable and animal oils are used with potassium or sodium hydroxide as an emulsifier.

There are now on the market a number of these miscible or soluble oils used against all scale insects and the eggs of many insects present on the trees during the dormant state. For the lecanium scales they are the only specific. The best of these oils are effective when diluted with water in the proportion of one part to from 15 to 19 parts of water. Applications should not be made when the temperature is below freezing nor while the trees are wet with snow or rain. Trees are less susceptible to injury just before the buds start in the spring.

TOBACCO

The principal alkaloid in the tobacco plant is nicotine, which is a violent poison to most insects and their larvae, and because of this it is one of our most useful insecticides. Pure nicotine is a colorless oily fluid, slightly heavier than water, of little smell, but of an extremely acrid burning taste, even when largely diluted. It is perfectly soluble in water and is entirely volatile. Commercial tobacco preparations have been on the market for some years and contain the active agent nicotine in the form of nicotine sulphate which is non volatile. The most widely used nicotine preparation is "Black Leaf 40" and this is the standard of strength which the manufacturers of other preparations have followed, containing 40 per cent. nicotine which is equal to 51.8 per cent. nicotine sulphate. Nicotine solutions may be used alone or in conjunction with miscible oils, lime-sulphate lead arsenate, soap and Bordeaux mixture.

FUMIGATION

Hydrocyanic Acid Gas. The fumes of hydrocyanic acid gas are destructive of all animal life. This gas may be used to destroy insects wherever the parts to be treated can be enclosed in an air tight chamber. For generating the gas, use of cyanide of potash (98 to 100 per cent. pure) 1 oz., Sulphuric acid 1½ fluid ounces, water 3 fluid ounces for each 100 cubic feet of space. Pour the water in a wooden or earthen vessel, add the sulphuric acid and lastly put in the cyanide and leave the room immediately.

Carbon Bisulphide. This is a colorless liquid having a pleasant odor when pure, but is almost always fetid because of the impurities commercial grades contain. It is very volatile and vaporizes at ordinary temperatures quite rapidly. When mixed with air it is explosive and should therefore be kept away from fire. It is very efficacious as an insecticide especially for use in treating stored grains or any infested substances packed in tight receptacles and insects

living underground. The gas being slightly heavier than air, diffuses into all crevices and spaces below the point at which it is generated. It kills insects by asphyxiating and paralyzing them. Use one pound of the liquid to every one hundred cubic feet of space or one hundred bushels of grain in the bin and ½ lb. per square yard injected into the soil.

The CHAIRMAN: Gentlemen, you have heard the report; what is your pleasure?

It was moved and carried that the report be received and placed on file.

The CHAIRMAN: Gentlemen, at the close of the afternoon session there was a question postponed or voted to be laid upon the table until this morning and taken up at this morning's session. We will now take up that question, and anyone having anything to say, now has the opportunity.

A Member: What was the question?

ASSISTANT SECRETARY WELD: Mr. Chairman and Friends: I think the question was relative to the proposed measure submitted by Master McSparren, of the Pennsylvania State Grange.

MR. CREASY: Mr. Chairman, I came here partly to make a statement about something else, but while that subject is up, I wish to say that it was presented by the Master of the State Grange, Brother McSparren, as a matter of courtesy to the members of the State Board of Agriculture, and perhaps he was received a little somewhat like the lady Sunday school teacher that was trying to impress on her pupils the necessity of saying a blessing at the table. She asked the little pupils one day at Sunday School, "What does your father say when he sits down at the table?" "Why, he says, 'Kids, go slow on the butter, it's forty cents a pound.'"

Now I want to say, as a member of the Legislature, that for sixteen years I have been the friend of the State Board of Agriculture; that under the act of 1895 it was practically wiped out, I think, and if you remember, Brother Sexton and others with us in the Legislature put the State Board of Agriculture on its feet and it is doing splendid work and I have been its friend. I am a pretty old member, perhaps a great deal older than I look, because during this last campaign I met an old gentleman in the western part of the State who said he was ninety-six, and when I was introduced to him, he said, "Yes, I read about you when I was a boy."

Now the object of this measure—of course you could see by the Governor's message what he intended to have done, and going over the State—and I don't want to speak disrespectfully of our Department of Agriculture, because it has been doing good work and its all right; but there seems to have crawled through the different acts of the Legislature creating those departments and adding to them at separate sessions of the Legislature, not the cohesive power or the power that ought to be in the head of the Department. This bill provides that the head of the Department shall make the budgets for the appropriations, and another object of the proposition is to take

the thing entirely out of politics. When you go to Washington—I have been there, and looking over the National Department of Agriculture, the only change I could find was the appointment of the National Secretary of Agriculture. The Assistant Secretary, Mr. Galloway, told me he had been there for twenty-five years in the different departments, was promoted from one to another. I really believe that's a good thing, to get the heads of this Department of Agriculture and get it under one body.

You asked who should be put on the Commission? The Governor of the State—I don't belong to his political party at all, but if I should do the appointing, I tell you how I should appoint them; I would put five farmers on and two other fellows, because the farmers, as a rule, in all resolutions, have been asking both State and Nation that on these commissions a farmer should have representation. We did not get it, but at the same time I think we should carry out what we preach by letting the other fellows have some show, not enough to run the business; let's get their ideas. That is the way I should create the commission. There is nothing repealed, as I understand the act. The same salaries will apply to the different officials, but the act puts it under one head, where it ought to be. I believe that if you study the act, you will find it drawn in the interest of Agriculture, and the tendency of the times is to take these things out of politics and I think you all agree with us that that is a wise thing and I am really pleased with the Governor, with the stand he is taking in these matters. The question was asked yesterday about the Forestry Division; there's a lot of business, the forestry business and the Game Department and the Fish Department and the Water Department; we have fish wardens, game wardens, fire wardens and the Lord knows what other kind; it is a good time to put them under one department. I am not speaking for the Governor, but I have no doubt that part of his intention is to get these things so that they won't have so many heads.

I think that is a good proposition, and we didn't ask for any action by this body; perhaps it might be wise for you to refer it to your Committee on Legislation, but I want to assure you that this bill has been drawn up in the interests of agriculture. It does not interfere with the State Board of Agriculture, and when you talk to the Governor, you will find that he is friendly to the State Board of Agriculture just as the rest of us have been. Of course there are some things I am not so particularly struck with about some of the newer things that come along, but they are going to come and I don't want to be in a position like the old woman when she got in the train and it was going the wrong way and she said, "I ain't going on this train," but she went anyhow because the train was headed that way. These things are put before us and it is our business to guide them in the right direction. I did not like the idea of some young fellow coming to my farm after I had been at the business 38 or 40 years and telling me how to raise wheat and corn, but the National Government has made large appropriations and will, in the future, make still larger appropriations, and the thing for us to do is to guide that matter so they will do us the most good, because it is an old saying that it is pretty hard to teach an old dog new tricks, and that's the way with us farmers, and if it is managed

right, it will fill an important mission in our agriculture, and so we'd better march along with the progress of the times. I don't believe it pays to try to stop progress, and if we don't get to going in the right direction, that is our fault. I want to assure you again that I have always been friendly to the State Board of Agriculture, it is doing a splendid work, and you will find, as I said before, that the Governor is friendly to the State Board of Agriculture and all these agricultural agencies are needed in Pennsylvania to advance agriculture, because I don't think that agriculture in Pennsylvania is up to what it ought to be, comparing it with the West.

Now the matter that I was going to speak to you about more particularly was the matter of the work with the National Dairy Union. I have been elected its Secretary, and as you perhaps have been reading in some of the papers—you don't see it so much in the North as you do in the South—but there is an effort being made to organize the cotton seed oil interest of the South, and if you understand the oleomargarine fight as well as I do—they say the oleo people are willing to give us anything, give us a package and you can label it all you want to, chuck full of labels, providing you give the oleo people the right to color the product—that is the real fight in the proposition; when you people put over a certain percentage of moisture in butter, you are hauled up before the National Government and some people have paid as much as $600.00 or $1,000.00 fine, but there is nothing in the law to prevent the oleo people from putting in forty per cent. of water, and some have been doing it. As an Association of the National Dairy Union, we expect to organize the dairy interests and change the National Oleomargarine law so that every tub will stand on its own bottom. I suppose the country they are quoting to us as one of the greatest in the world is Denmark, and you will find that the Danish people are using perhaps more oleomargarine than any other people and yet making the best butter, but the Danish people are very particular about their color and oleomargarine is sold white in Denmark. In Pennsylvania we have a splendid law and have had it well enforced and we find that the laboring men are saying the same thing because they have been with us in this fight.

Before the last Legislature the President of the Federation of Labor of this State appeared and made a splendid argument. I don't think I could improve on it if I talked a whole day, and his argument was this, that the dairy cow cannot stand in competition with oleomargarine when it is colored, and eventually, he says, it will drive the dairy cow out of business and then you will pay for oleo what you pay to-day for good butter, and that has been the history of the beef business and on that argument we won. This means a great deal to the dairy farmers of the north and will mean a big fight, because the cottonseed oil interests are organized. I would like to have the assistance, and I know I will get it, of the State Board of Agriculture and the other organizations of Pennsylvania, in this fight at the next session of Congress where this thing will surely come up, because the papers state now, as I say, that those interests in the South are organized to bring it before Congress. I talked with the leader of Congress, Mr. Underwood, a few weeks ago in regard to this matter and he said it is not coming up at this

short session, because they had enough other business, but it is bound to come and the only thing for us to do is to get ready and take up the gauntlet as we did in Pennsylvania. Pennsylvania I think has a model oleo law and it is working well. Oleo is really in competition with butter and the laboring people or those who want to use oleo, are buying it cheaper, and Mr. Jelke, before the Committee,—one of the largest manufacturers, said there's more money in yellow oleo than in white oleo, but that the white oleo is the best. I am just asking this organization when the time comes, to put up this fight so we will be ready for it, because it is going to be a real fight, I assure you.

MR. KILLAM: I was going to make a motion that that bill that has been explained to us, that Mr. Creasy has just spoken about, be referred to a Committee of seven members of the State Board of Agriculture and they go over that matter carefully, do their duty and eliminate the objectionable features if there are any and if there are none, endorse it all and then confer with the Legislative Committee. I move that a Committee of Seven be appointed for that purpose.

Motion seconded.

The CHAIRMAN: Gentlemen you have heard the motion and it has been seconded. Are you ready for the question?

MR. WOODWARD: Why appoint a special committee, when we have a Legislative Committee for considering legislation?

MR. KILLAM: I will say in explanation of that, that it is to give this State Board of Agriculture a voice in the matter with the Legislative Committee, so that nobody can make any objections. The Legislative Committee we admit is for that purpose, but here there seems to be a disposition among members of the State Board of Agriculture to refer it to a Committee of Seven or some number, I make it seven, and let them go over the matter carefully and then, with the Legislative Committee, make their report.

MR. WOODWARD: I referred to the Legislative Committee of the Board, which is for the express purpose of considering legislation, and I cannot understand why a special committee should be appointed to consider one single bill when we have a Legislative Committee that is a standing committee of the Board, to consider all Legislative measures.

MR. PHILLIPS: Ladies and Gentlemen: We have not had an opportunity to weigh this bill that came before us yesterday. As a patron, it is some news to me, because it has never been brought up in order to give it due consideration. As a farmer, I have not had the opportunity and I know that many of my brother farmers have not had the opportunity to investigate this bill. Ladies and gentlemen, we have been creating a great many bills in our State; we have been creating quite a good many committees and commissions. Now the reason why I speak at the present time is because of some of these committees and the condition I find things in at the present time.

For instance, my mind now goes back to the road bill. Some years ago you know we created certain commissions there; today we have the roads, as you all know, and you know the conditions and so on. I simply drop that for your thought. Now it occurs to me that the State Board of Agriculture has been doing a wonderful work. By this bill, as I see it, they have not taken it into consideration. I think that the State Board of Agriculture of Pennsylvania has been doing a wonderful work and I believe that they ought to be taken into consideration in this matter and they ought to consider this bill well and if it is a good thing, after due consideration and careful consideration so that we make no mistakes then is the time for it to go forth.

MR. J. ALDUS HERR: As this bill was presented before this organization chiefly for explanation and not as a part of its business, necessarily, why should not this Committee of three or five that is to be appointed by the Chair, confer with the Governor when it is the Governor's wishes that something like this should be presented to the Board? It is not the regular business of the Board, therefore why should not this Committee of three or five present its report to the Governor and have him sanction or help with them to make any amendments or corrections that the Board sees fit to suggest? That is my idea.

MR. KILLAM: That will be all up to the Committee, Brother Herr.

MR. JOEL A. HERR: I rise to a point of order; I want to know what the subject is under discussion? Is it the resolution offered by my friend, Brother Killam, or is it the report as read by Mr. McSparren yesterday, that has not come before us? I want to know what the question under discussion is, and let's confine ourselves to the subject.

MR. KILLAM: The making of the laws is within the Legislature; the State Board of Agriculture cannot make any laws, but it can be a great big factor in framing such laws as are best adapted to our agricultural conditions throughout the State. I get my living off of my land; I know what it is; I live right on my land; I till the soil for my living; I know what I want and I presume there's lots of others here in this same condition. Now I want the State Board of Agriculture to have a little something to say and a good deal to say in relation to this bill; and I want them to have a voice with the Legislative Committee and I want that Committee to go before the Governor and talk to him about it and see what the Governor says and how he feels about it and see if the Governor don't feel a good deal as that committee would. That is why I made the motion to make the Committe large enough, a committee of seven, and I think that is the proper channel for it to go through.

The CHAIRMAN: Gentlemen, in answer to Brother Herr's question, as I understand, what is before the House now is the motion that Brother Killam has made in reference to the question that was yesterday laid upon the table or referred to this morning.

The SECRETARY: If you will allow me, Mr. Chairman, to add to what you have said, the question before the house is the motion made by Mr. Killam and that motion is that the whole matter brought up by the presentation of the bill here for the opinion of the State Board of Agriculture, in order to let the State Board know what this bill proposes to do, that that whole matter be referred to a Committee of Seven and that that Committee of Seven, after having due deliberation—and of course that embraces the privilege of consulting with the Governor or anybody else that they have any desire to consult with—that it shall be referred to such a committee and after they have deliberated upon it and reached some conclusion, they shall make their report to the Legislative Committee. Now that is simply answering what is before the House.

The CHAIRMAN: The question has been called: Are you ready for the question?

MR. WOODWARD: I am unalterably opposed to the appointment of a second Committee to take up the duties of our regularly organized Legislative Committee of this Board; it is for this very purpose and I don't see what is the object of appointing a special committee to take up a matter for which this Committee is regularly appointed. It seems to me that it is a slight on our Legislative Committee, I am not a member of it or of any other Committee, but I do say that the Legislative Committee should consider this. A bill has been presented here without the slightest consideration shown to the Board of Agriculture. The gentleman who read the bill last night was nonplussed and seemingly mortified when questioned why the Board of Agriculture had not been represented in this body, whatever and whoever it may have been, that organized that bill, and why it should now come here for the consideration of the Board when the Board was absolutely ignored. I don't understand. If I heard the bill correctly, the purpose of the bill is to substitute for the Governor of Pennsylvania a Commission, so called, of 7 members, seven men, $1,500 men, with an aggregate salary greater than that of the Governor, who should elect a Secretary of Agriculture who, in turn, should appoint all his subordinates from top to bottom, and substitute that sort of an organization for the Governor of the Commonwealth. Mr. Chairman, I was not a supporter of Candidate Brumbaugh, but I am a supporter of Governor Brumbaugh. I believe that he is broad in his purpose, broad in his conception of his duty. I believe that he has the welfare of the agriculture of Pennsylvania at heart more than any other Governor in many, many years. He has outlined a plan for himself and I look upon a bill of this kind as an improper thing for us to act upon less it has the careful consideration of the Board, and that consideration, if it is to be given at all by the Board—and I know of no reason why it should be considered, since the Board was ignored in the organization of the thing—if considered at all, it should be considered by the regular Committee appointed for that purpose.

MR. KERRICK: Mr. Chairman and members of the State Board; I want to congratulate Governor Brumbaugh on the stand he takes in regard to agriculture, and it appears to me this morning that we

should go carefully in this matter, and therefore I move, Mr. Chairman, as an amendment to the resolution offered, that this be referred to our Legislative Committee.

Motion seconded.

MR. McSPARREN: I wish to speak a word on a statement that was made by the gentleman to my right, to the effect that I was nonplussed yesterday because of the question that was asked me with regard to the State Board of Agriculture. Now I admit I was a little bit nonplussed, but not for the reason he speaks of. I was nonplussed because I was surprised that a dignified body such as this, composed of men of experience, would stop to ask the question Who wrote a bill? I wonder how many of the bills before the Legislature of the State of Pennsylvania from time to time—the people of the State know who wrote them, and what difference does it make who wrote them? I admitted here before this body that this was a self constituted committee. The need seemed to be pretty generally recognized for some move of this kind. Now if the State Board of Agriculture or any few members or one member of the State Board had seen that need and acted upon it, he had a perfect right to draw that bill himself, if he wanted to, or any other citizen of the State of Pennsylvania, and it seems to me absolutely wide of the question for any one to raise the point as to who wrote the bill. The question is, Is the bill a good one? And it was brought here in that spirit. We did not presume to know anything more about this subject than anybody else, but as a band of 21 men that had given these questions some thought, we got together and drew the best bill we could for the purpose. That, as has been explained to you, is the spirit in which the bill is drawn, and therefore I admit that my nonplussing came, not from the fact that I was nonplussed because the State Board of Agriculture was not consulted, because the fact is we did not consult anybody that was connected with the Department of Agriculture in any form in the State, and you can easily see that that was, I think, a wise proposition, and therefore I do not want the idea to go before this body that I was nonplussed for that reason; but I was surprised that a dignified body like this would stop to question who wrote a bill, because it does not make a bit of difference one way or the other who wrote a bill and where it comes from, if the bill is right and serve a just and good purpose, and it was brought here in that spirit. We believe that that is a very good bill; we spent a lot of time on it and worked with men who have studied law and who understand the making of laws and we think we have got a bill that will do the people good and one that is drawn in the interests of agriculture. You all have a right to pass on that. You all have a right to state what you believe, whether or not the work of that self constituted committee is a good work, but it seems to me that you are wasting time on the question as to whether or not your Board was consulted. If your Board should be consulted, why should not every county organization be consulted? Why should not the farmers themselves be consulted? You can easily realize that if everybody has to be consulted, you will never have any bills drawn. Somebody has got to draw a specific proposition and then discussion comes upon the proposition itself.

MR. BARNES: It took 21 men quite a length of time to draw up this bill; it don't look unreasonable to me that there should be at least 7 men put on a committee to investigate the bill and study it and get acquainted with the terms of the bill. I am a representative of the County Agricultural Society in this meeting and I believe that the members of the State Board from the different counties all over the State are the representatives of those counties and I favor the first motion that was made, to put the question to a Committee of Seven for the benefit of the members of this Board, to study out that bill.

MR. E. L. PHILLIPS: I also favor the placing of the bill for consideration in this Committee of Seven. We care not who wrote the bill, that makes no difference at all, but we do care brother farmers, as to the results of this bill. We are getting so many commissions and so on, that sometimes I cannot help but wonder where the money is going to come from to pay the freight, and Jones pays the freight every time, and, brother farmers, you are Jones in this case and this is a bill that concerns the farmers, I see no reason why it should not be left open here for a short time so that it can be considered and considered very carefully before it passes or becomes a law. I can see no reason why there should be any objection to that at all, and I favor this Committee of Seven their giving this bill very careful investigation. It may be right, we don't say it is not but the idea is that we don't want to go into things hastily, as we do sometimes and have sometimes done in the past. Let us be very careful and very considerate, and then, once we have done our work, we can say it has been well done.

The CHAIRMAN: Gentlemen, we have two motions before the house. As I said in the opening of the meeting this morning, now we are farmers; I see we are differing, but I hope it is all for the best. I wish to say that in our county, Tioga county, we are very strongly with the grangers in that county, the strongest county in the State, if I am right, and they are very much in earnest over the deliberations of this body and of our institute, our county institute. Never has there been in the history of Tioga county, such interest taken as there has in the last five years in Farmers' Institutes. Whatever you gentlemen do, don't do anything that will retard that progress. The Secretary will read the amendment and we will vote upon the amendment first.

ASSISTANT SECRETARY WELD: Gentlemen, first Mr. Killam moved that a Committee of Seven be appointed to consider the Agricultural Commission Bill and that they report to the Legislative Committee. It has now been moved to amend that and that the matter be referred directly to the Legislative Committee.

The CHAIRMAN: The motion as amended is carried and it will be referred to the Legislative Committee.

The SECRETARY: Mr. Chairman, I noticed this morning when I came in that we had the good fortune of having with us the Dean of the Agricultural School at State College. I don't know whether

he has gone out; I don't see him now; if he is here, I would like to have him say a few words to us—Prof. Watts. Is Mr. McDowell in the room? I know we will be glad to hear a word from Mr. McDowell; he is in charge of the Extension work of the college, a work in which we are all interested, and if he is here I would like to hear a word from him.

The CHAIRMAN: There being no answer from these gentlemen, we will proceed with the regular routine business, and next on the program is the report of the Committee on Resolutions.

The Committee on Resolutions submitted the following report:

REPORT OF RESOLUTIONS COMMITTEE

We, your Committee on Resolutions would offer the following as our report:

Resolved, That we favor more liberal appropriations both to State College and for the use of the State Department of Agriculture to the end that each may be able to continue the efficient work now being done.

WHEREAS, Having learned with deep regret that our efficient Secretary of Agriculture, Hon. N. B. Critchfield, has decided not to seek reappointment, we, the members of the Pennsylvania State Board of Agriculture, in convention assembled, desire to give expression to his valuable services along the lines of agricultural education and improvement, which has been a great blessing to this State; and it is with a sense of sadness that we will not, officially, have his presence at our meetings, whose genial and courteous manner and pleasant smile and warm handshake made us all feel at home in his presence; therefore be it

Resolved, That as our Secretary, Hon. N. B. Critchfield, lays down the burden and responsibilities of his office, and retires within the quiet and rest of his family, we hereby tender to him our most sincere wishes as he passes into private life, praying that the sunsetting of his life may be bright and happy, and,

WHEREAS, the Deputy Secretary and Director of Farmers' Institutes, Hon. A. L. Martin, has, with untiring zeal and efficient management, carried forward the work of Farmers' Institutes and Movable Institute Schools to such a high plane of activity, whereby a wonderful uplift has been given to agriculture in Pennsylvania, therefore be it,

Resolved, That we, as members of this Board of Agriculture, in convention assembled, hereby desire to give expression of our appreciation for the great services our Deputy Secretary and Director of Institutes has rendered the Commonwealth in the development, inculcation and broadening of agricultural knowledge along practical as well as scientific lines, by which he has awakened an intense interest in the work of the farm:

We would report the following as placed in our hands for consideration, to this body without recommendation.

The following resolutions were unanimously adopted at the regular meeting of the Clearfield County Agricultural Society, January 22, 1915:

WHEREAS, There seems to be considerable dissatisfaction with the decisions of the State Officials with regards to the disposing of stock having contagious diseases; as the law is, the owner of the stock does not have any jurisdiction over the investigation, and it is supposed that many healthy cattle have been slaughtered at great loss to stock owners, therefore be it

Resolved, That we ask that the law be so changed that the stock owners may have the privilege of securing a competent person to make investigations, and that such person shall have the privilege to confer with State Officials before the stock shall be slaughtered;

Resolved Further, That we ask the State Board of Agriculture to pass similar resolutions.

(Signed) CURTIS READ, Pres.
W. E. DAVIS, Sec'y.

Not acted upon by Committee. Be referred to the Board for action.

JOHN SCHOENER,
F. S. BRONG,
G. A. BENSON,
J. A. HERR,
B. F. WAMBOLD,
Committee.

The CHAIRMAN: Gentlemen, what will you do with the report of the Committee on Resolutions?

MR. WOODWARD: I would like to ask for information. My hearing is homewhat defective; as I heard the resolutions read—the gentleman's voice was not very strong—I understood it to make a recommendation to the governor for the appointment of a successor to our esteemed Secretary of Agriculture. Am I correct in that?

The SECRETARY: I did not so understand it.

The CHAIRMAN: It is not understood that way by the Chair. If there's anyone who understands it that way, we will have the resolution read again.

MR. JOEL A. HERR: There is nothing in it concerning a recommendation.

The SECRETARY: That resolution is one, I think, in which the Board will want to unite. It was commending the good work that had been done by the Deputy Secretary of Agriculture in his official place as the Director of Institutes.

MR. WOODWARD: With all my heart I am ready to stand for it. I only want to know whether there was a recommendation to the Governor for the appointment of anyone?

The SECRETARY: No. If you call for the reading of it again, Mr. Woodward, it shall be read.

MR. WOODWARD: I am perfectely willing to accept the Secretary's statement.

MR. STUDHOLME: I would like to hear the reading of the first section of the report of that Committee on Resolutions; I didn't get it very well.

MR. WOODWARD: The last resolution I did not hear at all.

The CHAIRMAN: We will have it all read.

(The Assistant Secretary read the Resolutions again.)

The SECRETARY: I think we might just as well take up each item and adopt it seriatum; and I move the adoption of that first resolution by the Board.

The motion was seconded and the resolution favoring more liberal appropriations to State College and for the use of the Department of Agriculture, was adopted, and the second resolution, relating to Secretary Critchfield and Deputy Secretary Martin was read.

MR. JOEL A. HERR: I move the adoption of the resolution as read.

Motion seconded.

MR. WOODWARD: Some years ago, a good many years ago, longer than, in the presence of our esteemed Secretary, I think I care to mention, I happened to be at an Institute in Somerset county, it was immediately after the close of the Chicago Exposition, in which the Secretary had been appointed one of the important judges of agriculture, and where, by his courteous deportment and kind disposition, he had won honors for Pennsylvania, and I was called upon, as one of the Institute, to say something of what had been done there by him as a representative of Pennsylvania and more particularly of the home people in Somerset county. It was a pleasure at that time to say in words that were not mistakable, that Pennsylvania owed him a debt for that which he had obtained for us by his honest and pleasing conduct. I am exceedingly glad to be able at this time to support this resolution when it expresses the same sentiments I then had occasion to express there. Secretary Critchfield, throughout his career, has exhibited courtesy and urbanity that is pleasing to his constituents. No letter was ever addressed to him that was not answered in a kindly way. No request was ever made that was not either denied or affirmed in such a manner that no one could take offense, and possibly gave great pleasure. Consequently it is very gratifying to me as a farmer of Pennsylvania, acquainted with him during his long term of service, to vote Aye upon that resolution.

MR. MATTHEW RODGERS: It gives me pleasure to say Amen. Twenty-one years ago I came on to this Board, a green country boy from the farm, and Mr. Critchfield was then a member of the State Board, and after my papers have gone before the Committee of

Credentials and I was admitted as a member of the State Board 21 year ago, Mr. Critchfield came around and spoke to me and made me feel at home and I have felt at home ever since, and I want to say Amen to each and everything in favor of Senator Critchfield and his capacities.

MR. KERRICK: I want to express my regret at the worthy Secretary's retirement, and I want to say to you gentlemen that I think no man stands higher in my county than your worthy Secretary, and it is with regret that I take home with me the news of the retirement of our worthy Secretary in Brother Critchfield. The greatest of courtesy has always been extended to me whenever I have met him in this State Board meeting and it is with pleasure that I vote Aye for this resolution.

The SECRETARY: Mr. Chairman, I could not find language if I were to attempt it, to express my feelings and particularly the feeling of gratitude I have for the kind words that comes from those who have been associated with me in the arduous work to which I was called twelve years ago. We will not have time to continue this discussion any longer; there's other business that must be attended to and therefore I hope the discussion will be closed and we will go on with the business.

Resolution was then adopted by a rising vote.

The CHAIRMAN: Next on the program, members of the Board, is the report of the Legislative Committee. Are they ready to report?

MR. BLYHOLDER: They are, Mr. Chairman.

Mr. Blyholder then presented the report of the Legislative Committee as follows:

REPORT OF LEGISLATIVE COMMITTEE

Your Committee begs leave to report that at the last annual meeting, resolutions and recommendations were adopted favoring the following legislation:

(1) An amendment of our Fertilizer Law, so as to require manufacturers of fertilizers to include in their statement of the elements of plant food their fertilizers contain, a statement of the sources from which such elements are derived.

"We also recommend for the more safeguarding of the farmers of our State, that an act be passed by the present Legislature for the appointment of an Inspector of Fertilizers who shall visit from time to time the various fertilizer plants in our State, the duties to be defined by the Secretary of Agriculture. The tendency to use Leather Scrap and other various elements in the makeup of fertilizers, which is entirely worthless as plant food, is apparent and to better safeguard the tendency, a fertilizer inspector appears to us an absolute necessity."

(2) An amendment of the Act of 24th July, 1913, regulating the sale of commodities, so that the legal weight of a bushel of fruit, vegetables and certain other commodities shall not be in excess of the actual weight.

(3) A law for the regulating of commission business so far as the same relates to the sale of agricultural products.

(4) A law regulating the sale of lime for agricultural purposes.

With respect to these four recommendations your Committee has had bills prepared, in tentative form, which they are ready to place in the hands of the Legislative Committee to be appointed at this session whose duty it will be the use all honorable effort to have them passed by the General Assembly now in session.

A recommendation was also made for the increase of appropriation for protection by the State Police Force and requesting our Legislature to provide more adequate protection of life and property in the rural sections of our State. No bill has been prepared covering this recommendation, for the reason that your Committee is advised that the Superintendent of the State Police Force has under consideration a bill of that nature, and we respectfully urge the Legislative Committee, to be appointed at this session, to aid in any proper way possible, the passage of any such measure that may emanate from the Police Department; and in case no such measure shall be officially presented, to have a proper bill framed, and if possible, secure its passage.

The report of the Special Road Committee that was appointed at out last annual meeting and submitted to the Board at the Stroudsburg meeting, May 28th, was adopted and referred to your Legislative Committee without instruction; and as it is currently stated and generally accepted as correct, that the Governor, recently inaugurated, is now engaged in working out a satisfactory solution of the road problem, to be taken up by the present Legislature, your Committee has thought best to await developments, and in the meatime would recommend to the Legislative Committee to be appointed at this meeting, that it shall take note of the progress of any road legislation that may, during the session, be under consideration and be ready, as opportunity may offer, to give aid toward securing any of the ends recommended by said report of your Special Road Committee, to which this Board is committed by its adoption.

Respectfully submitted.

S. S. BLYHOLDER,
M. M. NAGINEY,
H. G. McGOWAN,
ROBERT W. LOHR.
Committee.

The SECRETARY: I move the adoption of the report as read.

Motion seconded.

MR. BRONG: I move, as a substitute, that the report be adopted seriatim.

The SECRETARY: I am willing to accept that. We will have it adopted seriatim, taking it up item by item.

Item one of the report was read.

MR. KILLAM: Is there no way out of this long delay? We have a Memorial Committee to report. We all understand that resolution, it's a very able document and I think it fits in good and is a proper thing. There is only one motion before the House, and that is the adoption of the Resolutions as read.

MR. BRONG: The objection I had to adopting the resolutions as reported was in reference to something connected with that first resolution and that is the appointment of a Fertilizer Inspector and the fear I had was that that would be made the prominent feature rather than that which the Board had in mind. That is a part that the Legislative Committee recommends and it is not made prominent, that is, there is no particular objection to a fertilizer inspector, but the idea that I had in mind is that the legislature, when it comes before them, will take it that that is the important part, and it is not the important part; the important part is for the farmer to know where his fertilizer comes from.

The SECRETARY: Well, Mr. Chairman, I think that that was adopted at our former meeting and I think that the report so stated.

MR. BLYHOLDER: The part as adopted recommended, and the bills are prepared—but this is an additional recommendation of the Committee and it does not come in the same bill, so that that is no feature of what you are working at, it don't come in the same bill.

MR. BRONG: I withdraw my amendment.

The report was then adopted as a whole.

The CHAIRMAN: Next is the report of the Memorial Committee.

MR. JOEL A. HERR: Before that Committee reports, there should be a report from the Committee that was to consult with a similar Committee of the Trustees of State College concerning the matter that came before us the other day. It was a joint committee. I was waiting for Dr. Conard to make that report. He has just gone out, but the Memorial Committee has a report. I was not here when Col. Woodward made a report upon the death of Ex-Governor Beaver, who was a member of this Board, but we have omitted to say anything about that in view of the fact tht I have no doubt he prepared a splendid report upon that death. There have been only two other persons reported to us who have died during the year that were connected with this Board.

Mr. Herr then presented the following report:

REPORT OF MEMORIAL COMMITTEE

Your Committee on Memorials begs leave to reports as follows:

We have learned that within the past year, at his home in Montrose, Pa., Mr. Roger S. Searle, a former member of this Board, representing Susquehanna county, has passed from labor to reward. Mr. Searle was one of the foremost and most efficient members of this Board, having filled at various times all of its important official positions. He was a man of extraordinary appearance, of marked ability and one of the most thoughtful and progressive members of this Board, having filled at various times all of its important official memory. We honor his memory and will strive to emulate his good deeds.

We are also called upon to record the death of Dr. Isaac A. Harvey, Mineralogist of the Board, who, within the past year, died at his home in Lock Haven. Dr. Harvey was a Clinton county product, having been born in Clinton county and educated in Lock Haven and in Bethany College, West Virginia. He was of excellent parentage, a man of very high, pure character and an extraordinary student. He was a man of great literary ability and had an extraordinary command of language. He was a noted teacher and a profound scholar and an experienced geologist and mineralogist. He was also a man of high Christian character and contributed greately to the moral uplift of those who were fortunate enough to be his associates. He was a man of high ideals and aspirations which were only limited by the condition of his health and strength. We regret his death and will revere his memory.

Signed:

J. A. HERR,
A. P. YOUNG,
J. NEWTON GLOVER.
Committee.

On motion, the report of Memorial Committee was adopted.

MR. JOEL A. HERR: Mr. Chairman, I would like to say a word with regard to the report of that Committee of which you made me the Chairman. I visited the meeting of the trustees of State College, was very pleasantly and agreeably received and stated our thought concerning the question of the Lever Bill, asking that we be recognized—the Department of Agriculture, and the Board of Agriculture, that we have a proper understanding of its workings, and that what we were after was information more than anything else and to get an expression of the college trustees' view of the matter with regard to the disposition of these funds and to express ours, and we were courteously received. We were informed of the motive of the whole matter and we were satisfactorily informed, and after comparing our views, why we conceived that we had accomplished what we wanted, that is, that we had obtained the information necessary. Now, Dr. Conard has a report to make, as Secretary of the Committee.

DR. CONARD: Mr. Chairman, I suppose I must make the report simply because I was made Secretary of the Committee.

Dr. Conard then submitted the following report:

To the Members of the Pennsylvania State Board of Agriculture:

Gentlemen:

Your Committee appointed to confer with a like committee from the Trustees of the Pennsylvania State College, to confer upon the reception of Pennsylvania's proportion of funds to be come available from the Lever Bill, wish to report as follows:

That we had a very satisfactory conference with said Committee and after careful consideration of the apparent objectionable features and results, we decided to recommend the withdrawal of our protest.

(Signed) J. A. HERR.

On motion, the foregoing report was adopted.

The CHAIRMAN: Next on the program, gentlemen, is Miscellaneous Business. You all know what that means better than I can tell you.

The SECRETARY: I just whispered into the Chairman's ear a moment or two ago that if there was no miscellaneous business to be offered promptly, that he should not pump for any. Now, if anybody has anything you want to bring up that has not been considered and ought to come before the Board, bring it up promptly. If not, we will turn our attention in another direction.

MR. BLYHOLDER: I move you that we now adjourn.

The SECRETARY: If you will just withhold that for a moment—a little while ago I made the statement that we had the pleasure of having Mr. McDowell with us and also Prof. Watts, the Dean of the Agricultural School at State College, and I know that we will be very glad and anxious to hear from both these gentlemen, and I see that Mr. McDowell has come in. I always rejoice in the opportunity to get even with a fellow. I was in company—went in company with my wife up to the State College Farmers' Institute, and I said to Mrs. Critchfield: "Now we will take a seat way up here. I don't want to get into any trouble, I don't want to be called out here to talk tonight; and notwithstanding the fact that I was sitting further from where Mr. McDowell was than that door, he called me out the very first fellow. I didn't get an opportunity at him quite so early, but I know that he is full of the work, he is an enthusiast in the work in which he is engaged and the work in which we are all interested, the splendid educational extension work that is being done under the supervision of our State College. He is at the head of it. Now, Mr. McDowell, will you please come forward and tell us a little about your work?

MR. McDOWELL: Mr. Chairman and Members of the Board of Agriculture: I have known Secretary Critchfield for some time, and this is the first time that I have found him vindictive. I never would have accused him of anything of that kind. Unfortunately,

Dean Watts has gone: If he had been here, undoubtedly he would have been called first, and I might have had an opportunity of getting my thoughts together. I fear I am unable to tell you good people anything worth while. I feel possibly a little like a story, which all of you doubtless have heard, but it expresses the situation at the present time. A farmer was taking a load of potatoes to market. He started up the hill, the roads were bad and the end gate came out of his wagon. The potatoes gradually rolled out of the wagon box until none were left. Finally, he got into a mudhole and stuck, and of course the first thought that occurred to him was to get rid of part of this load. He got out of the wagon, looked around, took in the situation and scratching his head, said: "Stuck in the mud and nothing to unload." This is about my situation this morning. I had the pleasure last week of attending the celebration of a golden wedding in my home community. I don't know when I have enjoyed anything as much as I did that gathering. As a boy I was present at the celebration of the twentieth anniversary of the same couple. I met at this golden wedding people whom I had not seen for thirty years. I met there many of the associates of my boyhood days. I enjoyed that gathering because it brought to me very pleasant recollections, and in a measure I stand here this morning much in that same way. I realize that I am looking into the faces, in many instances, of personal friends, men with whom I have been associated for a good many years. I may say, in a few instances, men with whom I was associated and who helped me as a boy, although that might leave a wrong impression because I want you to know that I am still a boy and hope that I may continue to be one until I am as many years young as our worthy Secretary. Having had this association and knowing from personal contact something of the work that you men have done, I know as well as anyone how unselfishly and unstintedly your time, your labor, and your efforts have been given to the cause of agriculture and I believe I know too, something of what you members of the Board of Agriculture have accomplished in upbuilding the agriculture of Pennsylvania.

In the last two or three decades many changes have occurred. We find things today that would not have been thought possible years ago. One or two generations ago a printing-press turned out maybe two hundred papers an hour; today a printing-press will turn out many times that number of papers every minute. A dinkey engine can today do the work that years ago would have required a thousand men to accomplish. Edison has given us an electric light which today gives the light of 500 candles. These things show that progress is being made. This is true along all lines of endeavor. It is true in the great business enterprises, and as it has grown, diversification has necessarily come with it. Take the great railroad companies; they are organized today into a great many departments and no one department can do or understand the work of the other departments. The operating department is charged with certain duties; the traffic department with certain duties and the department having charge of the passenger affairs with still other responsibilities. Each department is made up of men who are trained in that particular field. Then the work of all these departments is properly coordinated in the executive offices so that the entire ma-

chine works smoothly to accomplish the intended purpose. This diversification has been taking place in agriculture and has been brought about because of the knowledge of fundamental principles which have been worked out. I remember very well when in an agricultural college one man was practically the entire agricultural part of the institution. A professor of agriculture taught everything that was taught in that field. As years have gone by that condition has been changed and we have diversification and a growing up of social departments for particular lines of work. Facts have become and are being made available which makes necessary this diversification if satisfactory work is to be done. You men have been responsible in a large measure in helping to get the sinews of war for the work that has been done and in creating the sentiment for agricultural education which has made all of this possible.

You may be interested to know that at State College today there are approximately 2,500 students pursuing work in the various courses, and that of the approximately 2,500 students, 1,237 are taking the various courses in agriculture; approximately one half of the students at the College are taking agriculture. Over 200 students are enrolled in the winter courses in agriculture; about 225 are pursuing the two years' course in agriculture and the balance are there taking the four years' course. These figures illustrate the interest in agriculture and a recognition of the importance of a knowledge of the principles which underlie the business of farming because truth underlies agriculture as well as it does any other business in which man is engaged. I don't want to take up your time. There is only one thing further I wish to say, and I want to say that because of the report made by the last Committee. We have heard a great deal about the Lever Bill. That Bill appropriates Federal funds to the agricultural colleges for extension work in agriculture and home economics. If, when the provisions of that Bill become operative—and they are operative now, provided the State meets what is required under the Bill—it will mean a great deal of responsibility for the College. I want to say to you frankly that the College feels that responsibility, I want to say to you as frankly that I personally feel very keenly the responsilibilty. This work cannot be done efficiently unless it has the active, cordial cooperation of all interests engaged and interested in agriculture, and I therefore, in view of the report just made, ask your cooperation in working this measure out in a way that may be helpful and effective to the farmers and to the State. I pledge you the best service the College can give and I pledge you my very best personal service in a cause in which I have had the pleasure of working with you men for so many years.

The SECRETARY: Mr. Chairman, before anybody else takes the floor I want to make an announcement: This has been handed to me, and the statement is that there will be a car leaving the Square for the new State Fair grounds at 1:30 in the afternoon: "Will be pleased to have all who can join us or join the party, be there." Now some one said to me that this comes from the State Breeders' Association. There is somebody who is going down to the proposed Fair Grounds and this invitation is to the members of the Board or anybody present who wishes to take the trip down there to join the party. That going down car will be at the Square at 1:30 this after-

noon. The breeders of Jersey cattle will meet in the lower room of this building at two o'clock today. This is the last session of the State Board Meeting. This afternoon there will be a joint session of the Breeders' Association and the Dairy Union, and that will be on the first floor of this building, in the room below, this afternoon at 1:30. That does not look very much as though it was the Breeders' Association that has planned the trip down to the Fair Grounds. Those matters were only mentioned to me within a short time and of course I cannot tell how it is. The Breeders' Association and the Dairy Union will meet in the room below at 1:30. There is an invitation for all who wish to go to the new Fair Grounds to join a party that will leave here—the car will leave the Square at 1:30 also.

MR. KERRICK: As there is no further business, I move that we adjourn.

The motion was seconded and adopted.

APPENDIX

PROPOSED STATISTICAL LEGISLATION

Requiring the County Commissioners each year to issue their precepts, on or before the first day of March, to be assessors of the respective townships, boroughs, wards and districts, and deliver to each assessor the necessary blanks for recording, as to each person, company and corporation whose property is listed, statistics of the previous year as well as certain other statistics for the then present year as to the number of acres, average and total yield of wheat, corn, oats and such other crops and information as may be in their possession which may be called for relative to agriculture in all its branches, including bee cultivation and honey production, agricultural production, agricultural labor, livestock, poultry and egg production. The assessor shall require each person, company and corporation whose property is located in his township, borough, ward or district to make answers to such inquiries as may be necessary to enable him to return the foregoing statistics; and said blanks with such entries shall be returned to the County Commissioner's office on or before the twenty-fifth day of May, who shall tabulate the same by townships, boroughs, and cities and forward the returns thereof to the Secretary of the State Board of Agriculture not later than the first day of July. These statistics to be published in the crop and livestock bulletins and the annual report issued by the State Department of Agriculture. The Secretary of Agriculture shall provide and cause to be delivered to the respective boards of County Commissioners before the fifteenth day of January the blanks to be used by the assessors and county commissioners for the proper return of the statistics and information required in this act. For such service the said assessor shall receive out of the county funds, such compensation, as may be fixed by the county commissioners, not, however, exceeding the per diem compensation fixed by law.

This act shall take effect on the first day of January one thousand, nine hundred sixteen.

PROCEEDINGS OF THE PENNSYLVANIA BREEDERS' ASSOCIATION AND DAIRY UNION HELD IN BOARD OF TRADE BUILDING, HARRISBURG, PA., JANUARY 26-28, 1915.

Wednesday, January 27, 1915, 9 A. M.

The Pennsylvania Breeders' Association and Dairy Union convened in joint session on the first floor of the Board of Trade Building, Harrisburg, Pa., Mr. E. S. Bayard, President, in the Chair.

The PRESIDENT: All you bald-headed gentlemen in the back row, please sit down and come to order. We want to get to work. Hey, you fellows out there in the sleeping car, please be quiet.

This is a joint meeting of the Breeders' and the Dairy Union. We want to unite this organization and the other organizations, and make one great, big central organization. In order to do this more effectively, I will appoint a committee—or rather, it has already been appointed—to confer on this subject. For the Breeders the committee consists of Dr. Marshall, Dr. Henry Fielden, and Mr. Cloud; Mr. Cloud is not here, so I will ask Mr. Norton to take his place. For the Dairy Union the committee consists of Mr. Stokes, Mr. Willis and Mr. Perham. Mr. Willis is not here, so I will ask Mr. C. B. Josnson to serve in his place. You gentlemen get to work now, and report on Thursday afternoon at 1.30. Please get ready to do something for this State. We must be thoroughly organized if we want to do anything or get anywhere. The Holstein-Friesian, and the Jersey Breeders, and all the other breeders want to come in with us and make one big, strong Association. If any of the organizations want to hold separate sessions at any time during the meeting, we will arrange for them to do so. They will maintain there individuality while belonging to this central organization.

MR. STEVENSON: It is the desire of the Holstein-Friesian Breeders to go into that organization.

The PRESIDENT: That is what we want. And if the other breeders will appoint a committee to confer with this joint committee, we will appreciate it very much.

MR. NORTON: Last year I was appointed chairman of the committee on amalgamation. We were to meet this morning at ten o'clock to try to map out a plan for the amalgamation of these organizations. If the other members of this committee will meet me, we will try to get down to work and see what can be done.

The PRESIDENT: Last year the Plant Breeders amalgamated with the Livestock Breeders. These things must be done if we want to get anywhere. Most of us are interested in one or the other or both of these things, and we must get together. I have been trying for the last two years to boom the Panama-Pacific Exhibition, and to

get up some interest in an exhibit there. I went to the Railroad and to the Governor and to the Commission to plead our cause, but I had no backing. Now, we have no money, and won't have any unless we get an appropriation, and by this time we should have had a schedule all made out to carry our livestock across the continent, and show the people that we can raise as good livestock in Pennsylvania as can be raised anywhere on earth. We must put Pennsylvania on the map, and let people know that it is in existence. I went to see the Governor, and while he was very cordial, and all that kind of thing, there was no money, or it was needed elsewhere, or it had all been spent or would all be spent, and we didn't get any of it. We need twenty-five thousand dollars to carry us there, and I see no chance of getting there at all unless something is done in a hurry.

MR. STEVENSON: I don't think it is too late to make a start to get there now. The exhibition of livestock will not be held until October, and it seems to me that while we are here it would be a good time to have a committee appointed to go before the Legislature and the Governor and see if they will not at least help the breeders by paying the freight on the livestock. The first thing to do, as I see it, is to get a freight rate on livestock to the Panama Exhibition. The states of Ohio and New York are going to do this, and so are some of the smaller states, and why shouldn't this great State of Pennsylvania do the same? We have here some of the finest livestock in the country, and it would be a shame for Pennsylvania to let some of the smaller states show up better at the Panama Exhibition than we do, and let Pennsylvania take a back seat.

The PRESIDENT: The first thing in order, now, I think, is the appointment of an auditing committee. I will appoint—

MR. LANTZ: Before you appoint the auditing committee, I would like to make this statement along the line of the livestock exhibit. Mr. Kemp is here, and he has sent out a letter to every Jersey breeder in the State to effect an organization before the close of the meeting. He has called for a meeting to be held tomorrow at ten o'clock.

The PRESIDENT: There is a Jersey Association.

MR. LANTZ: But it is not a State organization.

The PRESIDENT: Every breeder of Jerseys will please make note of that.

MR. KEMP: I might say that there are three hundred breeders of Jersey cattle in the State of Pennsylvania at the present time, and there should be some organization at this meeting. We want them all to meet tomorrow morning at ten o'clock to effect this organization.

The PRESIDENT: Mr. Bailey will probably be in the Chair this afternoon and tomorrow morning. Ask him to make further announcement of this meeting so that it may not be forgotten.

MR. LANTZ: The Sheep Breeders—I have had correspondence with every one, I think—have no organization, but it has been arranged to meet tomorrow afternoon to effect an organization. The

Berkshire Breeders will also meet here tomorrow afternoon. Now all these breeders have shown their willingness to organize, and I think this Association should help them by arranging for a place in which they can hold their meetings, and effect these organizations.

The PRESIDENT: That is easily enough arranged. There are several rooms outside or upstairs that can be used for the purpose of meeting and organizing. I think the Committee on Amalgamation should make some provision for the payment of dues. Some of you belong to two or three organizations, and when the big central organization is effected, some provision should be made regarding the division of dues.

A Member: Why not let it be understood that if a member pays two dollars, one of them will go back to his own organization?

The PRESIDENT: In other words, when this organization goes through, each man will be a member of the State organization, and also of his own original organization.

A Member: The Horticultural dues are two dollars, and last week at the annual meeting, we arranged for the persons in the organization to declare whether they were in the fruit work or in the vegetable work, and one of his dollars went to the branch in which he is engaged; and besides, it was arranged for the fruit growers and the vegetable growers to hold sessions of their own, in which to discuss their particular branch of the work.

The PRESIDENT: What we want is enough members to make a show when we come to ask for an appropriation.

MR. LANTZ: It seems I have got myself in hot water by speaking of the dues. I don't know whether they should be two dollars or what they should be, but at the meeting of the Plant Breeders' Association, it was decided that their dues should be two dollars.

The PRESIDENT: The Committee on Amalgamation will take care of that, and will arrange for the disposition of the funds of the Breeders and the Dairy Union.

Please standup, Bailey. He is so shy and modest that most of you don't know him, but he has considerable dairy interests in Pittsburg, where we believe in the Angus, which shows that he has plenty of courage.

I will now appoint the Auditing Committee: I have not had time to think it over, so will look over you to see who's here that will do for that work. All right; I'll appoint on that committee, Mr. Gorham, Mr. Blair and Mr. Forsythe.

Next in order, I believe, is the appointment of the Committee on Resolutions. I will appoint on this Committee, Mr. Stokes and Mr. Wise for the Dairy Union, and Prof. Severson and Prof. Gardner of the Breeders' Association. Any resolutions you may have, please submit them to Mr. Stokes. Where are you, Stokes? Get up, so that we may see what you look like.

MR. STOKES: Is it necessary to get on a chair?

The PRESIDENT: All right; get up there. Now all you people look at him, and any resolutions you may have to offer, please submit them to him. I believe we should have some resolution in regard to this Panama-Pacific matter. Also some resolution endorsing the State Livestock Sanitary Board in the fight against the foot-and-mouth disease.

A Member: Mr. President, I think the matter of taking up the question with the Legislature would be a good thing for the Resolutions Committee.

The PRESIDENT: Now, just a moment; we should ask for a very prompt appropriation for the people who have suffered through their loss in the Foot-and-Mouth-Disease. I am going to ask for an immediate appropriation to reimburse some of these men and get them on their feet again. We have all lost to a greater or less degree, but some men have lost practically everything they had and are in no position to start over again. I know one man who had eighty-two head of splendid calves. Now he has to sell them wherever he can, and for what he can get. They cost him 8½c. in Iowa, and after the outbreak of the disease about the time they came, the best he could do was 4½c. and even then the buyer was willing to let him have them back again if he could find another purchaser, but the other man was willing to pay even less. 4½c. was the limit. That man lost about nineteen hundred dollars, and he could not afford it. No man can, for that matter.

MR. PALMER: But the Federal Government ought to pay that.

The PRESIDENT: The State Sanitary Board are doing the best they can with the means at their command, but that does not cover the need. You have lost money, and I have, but so far as possible, we should see that the men who have actually suffered are reimbursed.

Now we are going to get down to work and listen to a little lecture. If any of you fellows have anything to say, you'd better say it now before the lecture begins. Anybody here got a recipe for hair restorer?

MR. STEVENSON: A good many here need it.

The PRESIDENT: I'm not the only one, as you'll see by looking over the room.

Tonight we will have a demonstration of meat cutting by Prof. Tomhave. Stand up, Tomhave, and let us look at you. Larsen, you also stand up and let us look you over. I don't want either of you fellows to have any advantage over me.

Now, then, we want to get some enthusiasm in our meeting; let us make it so enthusiastic that we will have all the crowd down here instead of upstairs.

A Member: There is another thing that I think should be taken into consideration by the stock breeders of Pennsylvania. We have been working on it for a long time, but have never gotten anywhere; we are just about where we started. And that is the dog nuisance. We are trying to put our State forward in every line, but I sometimes

think we are not giving sheep breeding as much encouragement as we should. It is not only a matter of sheep growing, but we must give him room to spread. Right here is where the dog nuisance becomes a menace. We have all suffered more or less, not only in regard to sheep, but in regard to our cattle and our horses, and when the time comes, I think we should hit a few good licks at this dog nuisance, and have a good law passed that will protect us. I know there is a law now enacted, but it is not enforced, and I can't see that it does very much good. If we can do nothing else, I think we should impress upon the members of the Legislature to see that this present law is enforced.

The PRESIDENT: Prof. Gardner is now going to talk to us about one of the most important subjects in our whole agricultural system. I want to introduce to you Prof. Gardner, of State College, who will talk to us on "Pastures."

Prof. Gardner spoke as follows:

PASTURES

PROF. E. D. GARDNER, *State College, Pa.*

Gentlemen: When your committee made up this program, I know they selected an important subject; but just why they selected me to talk on it, I don't know. I am sure that I would not have selected the subject for myself. I know that it is bad form for a man to assure you he knows nothing about the subject, and then try to talk about it.

This country has not developed pastures to any great extent. We find a dearth of literature on the subject, and at our Experiment Station we have done very little experimenting on pastures. The main source of reliable information is through a few farmers who have observed the results of practice.

The grazing of stock is probably the oldest agricultural practice known to man. We find reference to it in the Bible; in fact, it is stated that the son of Adam was a grazer of flocks, although his brother tilled the soil.

Coming back to modern agriculture, we find that England has been noted for her good pasture for practically a thousand years. They have given a great deal of attention to the subject, and have fine pastures, the very best land often being devoted for grazing purposes. In this part of the United States we feel that we cannot afford to devote to grass, land that is of very high value. In fact, that we must till all the land that can possibly be tilled. It is not only a question of how many dollars you can make per acre, but how many dollars you can make per man, and you can often get larger returns per man in devoting much attention to hay and pasture than you can from time spent on high priced crop.

One reason why we have paid so little attention to the growing of pasture is that we have had for many years a large tract of plains or prairie land, as free range and men could let their cattle run there, with no labor or other expense than was involved in bringing them in at the end of the year; so there was little need of developing pastures. But conditions are changed. These lands, once used for ranges, are being broken up into farms. The drier portions which were used for grazing have been over-grazed, and the grazing capacity largely reduced, so that the rearing of livestock is coming back towards the East, and there are opportunities here for developing pastures.

About 60% to 75% of the land in the East is not devoted to farm crops. What is that land doing? The forests have been cut off; there is very little merchantable forest left; the land is too hilly or rocky to be farmed with profit. What shall be done with it? At the Experiment Station, we realize the necessity of doing something with just this kind of land, but we lack the means and the men to undertake the investigations necessary to enable us to advise what should be done. We need a special appropriation for such investigation. A large part of this land, if we just know how to do it, economically could be turned into pasture. Much of it is too steep and rocky to grow potatoes or anything of that kind, but if it could be turned into pasture on which to graze cattle it would become productive and profitable.

The amount of grass and hay produced in the United States exceeds any other crop. I do not except even corn. And the money value exceeds that of any other crop. I believe we make more profit per man on livestock than on anything else in agriculture, and livestock is dependent upon grass. You all know the old Flemish proverb: "No grass, no cattle; no cattle, no manure; no manure, no profit."

Wherever agriculture is most highly developed, livestock is most firmly established. Look at England, for instance, and how we go over there to find blooded stock, dairy and beef cattle, horses and sheep of the highest type, and even swine. Even Germany has much livestock, and so we find in all the countries where agriculture is most highly developed, there livestock is firmly established. So I believe there is opportunity for us in the northeastern part of United States, especially on those lands that are not bringing in any returns. In this country, labor is high priced and land is cheap, and it seems to me that where these conditions exist, we ought to be able to grow pasture to advantage. As I said a moment ago, it is not only a question of returns per acre, but a question of returns for the man working on that acre. Land in pasture requires little labor.

All that is required for pasture is a soil that will grow grasses and clovers. In return, these will enrich the soil. In the South, where they grow corn and cotton year after year; in many places you will find the red clay subsoil sticking out on the top of the soil, because they grow corn and cotton from year to year without growing grass. In many places in Pennsylvania, you will find the same thing. No soil can be cultivated year after year without growing grass, except by wearing out the soil. It is necessary to grow grass in order to keep your soil in condition to cultivate it profitably.

We have very little data on the return per acre of pasture or the relative food value of pasture as compared with the same when cut for hay. There are a few experiments along this line which would seem to indicate that there is a larger yield when grass is allowed to mature, but in other cases we find equally good results when used as pasture. In allowing the animals to graze, they get, first, more protein; second, grass is more digestible than hay, third, it is more palatable; and fourth, the animal gets it through its own labor, rather than through the labor of man. We find, therefore, in many cases, that it is more profitable to have grazing lands, than it is to have hay fields. Another thing we might mention right here is that when the animal keeps the grass cut for grazing, it also puts the manure right back on the soil, thus reducing the labor to a minimum. Many farmers could easily put forty or fifty acres in pasture, and cultivate the balance of their farm with the some profit and less labor. But the question right now seems to me to resolve itself into a question of procedure. What character of lands may be economically seeded down to pastures? At Cornell, the Roberts pasture, which has been in continuous pasture for about twenty years, with a variety of grasses, is on a very steep slope, which, but for the covering of grass, would have eroded, or washed away.

Dr. Waters, when at the Missouri Experiment Station, conducted some experiments on pastures and the cost of producing beef in that part of Missouri, and be found that with steers pastured at 75c. per head per month, a gain of 1.65 lbs. per day was secured and he found that the cost on this basis was as low as $1.60 per 100 lbs. of gain. You may think this is too low. At $1.00, per head per month for pasture a gain of 1.85 pounds, daily was secured at a cost of only $1.90 per 100 lbs. of gain. These prices may be exceptionally low, but they show what has been done. In the winter, he got a gain of 5.40 lbs. per bushel of corn, and in the summer, when they fed grass with the corn, they got a gain of 6.8 pounds for bushel of corn. In other words, he got a greater return per bushel of corn when the steers were on grass than he did in the winter time when fed hay.

In an experiment in Illinois, when I was there some years ago; we had two acres of blue grass in each of two plots, on each of which we kept two steers. On one lot we kept two steers on two acres of land, without any suplementary feed and they kept in good condition and made good gain. On the second two acres we kept two steers and two shoats. The steers of lot two were fed a half bushel of corn daily, and the shoats followed and picked up the corn that the steers dropped. Both steers and shoats kept in fine condition, and in the fall the shoats that followed the steers in the summer made gains at the rate of fifteen pounds of pork per bushel of corn. That gives you a little idea of the capacity of the pasture, a steer per acre, plus the shoats. An average acre of pasture is expected to produce one hundred and fifty pounds of beef yearly.

I wish to call you attention to some experiments in Virginia conducted by Prof. Carrier, and described in Bulletin 204 of the Virginia Experiment Station. A field of twenty acres was laid off into eight equal plots. The tests, covering three years, included, alternate and continuous grazing and heavy grazing, and harrowing and discing. On these eight plots the gain for an average of three years was 160

pounds of live weight per acre annually. For the heavy grazing it was 190 pounds and for the light grazing it was only a little over half as much. No particular benefit was derived from either discing or harrowing. Light grazing encouraged the encroachment of weeds in the pasture.

The PRESIDENT: Do you think that experiment shows the capacity? Don't you think you would get a little more gain with a larger variety?

PROF. GARDNER: Yes; but this land was probably a little better than the average land that is used for pasture.

The PRESIDENT: This matter of alternate grazing, I don't believe in. I don't believe in fencing off a piece and grazing it awhile, and then fencing off another piece and grazing it another while. When I put a piece in pasture I want it to stay there. They get used to it, and thrive on it.

MR. BAILEY: Will one steer consume all the grass on one acre?

PROF. GARDNER: That depends on the grass and the steer.

A Member: Will it be enough for him?

MR. BAILEY: In dry weather it might not be enough, but in most cases I think it will be.

PROF. GARDNER: Under ordinary weather conditions, I think it will. The two steers on the two acre lots at the Illinois Experiment Station frequently ate only half of the grass and there were plenty of grazing for the hogs also.

MR. BAILEY: In other words, that is when the rainfall is normal, it would be ample, when the rainfall is below normal, it would hardly be sufficient?

A Member: Do you believe in keeping the cattle out at night in fly time; in other words, do you advocate keeping them in the stable during the day, and letting them graze only at night, during fly time?

PROF. GARDNER: That is something that depends laregly upon conditions. Under average conditions it is the practice to leave beef cattle and pound stock in the pasture all the time. Of course, it is necessary to provide some shelter to protect them from severe weather. But to leave them out during fly time, that is a different matter.

A Member: My experience has been that if left out during the day in fly time, they spend their time principally in tramping down the grass and swatting the fly. If you leave them in a nice, cool stable during the hot weather in the day time, and take them out only at night time, they will graze until about two o'clock. If you go out at that time, you will find them lying down, but about three they are eating again, and then about sunlight we take them in again, and we find it to our advantage. I believe that one of the greatest mistakes a dairyman can make is to turn his cattle out during the hot days in fly time.

The PRESIDENT: But cattle do not graze at night.

PROF. GARDNER: I think you are wise in turning this into an experience meeting.

A Member: I do not agree with you. We have been out and watched them.

The PRESIDENT: I have never run across any that grazed at night, and I have been in the field at midnight. They will graze before night, and in the morning, but not in the dark.

A Member: I come from Missouri, and you'll have to show me.

A Member: I go out for the dairy cattle, and find them grazing four o'clock in the morning.

The PRESIDENT: That is sunlight. Let us come out now and argue this out.

A Member: I have seen mine eat at night.

A Member: Doesn't that affect dairy cattle more than beef cattle, perhaps?

PROF. GARDNER: I used to go out in the early morning and bring in the dairy cattle myself and I know something about it, too.

The PRESIDENT: I know you, and I don't believe you ever went out before daylight, unless it was in going home after you'd been out all night.

PROF. GARDNER: I agree with Mr. Bayard that the cattle will not graze at night when it is so dark they cannot see. If they are kept in during daytime, and turned out only at night, they may change their habits, but ordinarily they will not graze when they cannot see.

While the question of making these pastures is one I cannot tell you very much about, perhaps I can throw out some suggestions.

First, How shall we make these pastures? There are two conditions under which we will have to work. The first is where the land is in good condition, and there is a part of it that we can turn into pasture, without sacrifice, and the second is where the land is poor, and a large part of it should be put into pasture in order to utilize it. The proportion of the land that should be devoted to pasture, when to seed it, and how; what kind of fertilizer to use; whether to seed it to pasture grasses alone, or to mix something with the grass. This, of course, will depend upon the kind of grass to be used and other factors. In most cases we find it advisable to seed clover in the spring-time, but blue grass, red top and timothy, are generally best seeded in the fall. The blue grass germinates much better if subjected to an alternating temperature such as we get these warm days and cool nights in the fall. Clover seed, on the contrary, does not favor this alternating temperature, but likes a low, uniform temperature, so we find that the spring is the best time for clover, and the fall the best time for grasses.

Whether we shall seed it with a nurse crop of rye or wheat in the fall or seed in the spring with a spring grain is also a question. The average farmer does not wish to lose the use of his land during one season, as he has to do if he seeds to grass alone. Blue grass and red top require considerable time to become established. Given a temperature that is suitable, if some good red clover or timothy is mixed with it, it comes up quickly, and gives us a pasture the first season, and the clover will leave the soil in better condition for the permanent grasses.

MR. KESTER: Do you think it is good practice to pasture meadows after harvesting a hay crop when it is to be cultivated next year?

PROF. GARDNER: That will depend upon conditions, such as value of the land, is it fenced, what will be next grown on it, and what will be the return per man and per acre as a result of such pasturing.

MR. KESTER: If it will grow a second crop?

PROF. GARDNER: In that case I think it would be good practice. I have here a few slides that will show some experiments on pastures.

Slide 1. Shows two grass plants of the same species growing side by side. Note the difference due to individuality. The next slide shows orchard grass in flower.

Here we have a few sample heads of blue grass. This is smooth broom grass. We have quite a few selections of this at the college. Notice how luxuriant its growth, and how erect it stands. There are localities where a little broom grass might be mixed with blue grass to advantage. The only objection to it is that it grows in clumps. It is well adapted to dry soils and dry seasons.

A Member: How old is that grass?

PROF. GARDNER: Prof. Noll is here; he can tell you.

PROF. NOLL: About three years.

PROF. GARDNER: This is an individual plant of common red clover. When the plant spreads out that way, you can readily see that it will occupy a very large space of ground.

Here is a plant of mammoth clover; it comes into bloom a little later than medium red and has some characteristic markings on the leaves. This is alsike clover; it is more tolerant of soil acidity than red clover, and it makes a very good quality of hay.

We, in consdering mixtures for our pastures, have not been in the habit of using as many different kinds of grasses as they use in England, and it might be well for us to consider adding more varieties to our pastures. Here is a mixture which we have found very successful. You will notice that the kinds and the quality varies according to the soil.

GRASS SEED MIXTURES FOR PASTURES.

	Lbs. of mixture per acre		
	Good soil	Poor soil	Wet soil
Timothy,	9	9	4
Red clover,	6	6	....
Alsike,	3	3	4
White clover,	1	1	....
Red top,	....	4	12
Kentucky Blue Grass,	5	....	8
Canada Blue Grass,	....	4	....
Orchard Grass,	4	....	....

This means about 20,000,000 seeds per acre, many of which fail to produce plants. The stand secured will depend chiefly on the germination of the seed, the character and condition of the seed bed and weather conditions.

MR. BAYARD: Don't you think you have the red top growing in the wrong place?

PROF. GARDNER: In the case of alsike clover you will notice that we have it in largest amount on wet soil. We recognize that red top will stand wet soil and sour soil. At the College, on certain very sour soils, we find that the crops are beginning to fail. Although clover and timothy is seeded on these soils, we find red top the only grass growing on them.

Notice the Kentucky Blue Grass and Canada Blue Grass. On good soil Kentucky Blue Grass does all right, but on poor soil it soon runs out. Canada Blue Grass is the best on poor thin lands.

A Member: How would you get Kentucky blue grass started on a clearing that has just been cut off?

PROF. GARDNER: I wish I could tell you how to do it. My time would be worth a great deal if I could tell people just exactly what to do. I would advise you to find out whether the conditions are adapted to blue grass. If conditions are favorable seed it liberally; once it has a good start, it will take possession of the soil if conditions are right; soil and locality should be adapted to it.

A Member: Will blue grass flourish on hard mountain soil?

PROF. GARDNER: By constant application you could perhaps make it grow, but it is hard to grow it in some localities.

A Member: Would you recommend lime for blue grass?

PROF. GARDNER: Yes, I would recommend liming for blue grass in most localities in Pennsylvania.

(Slide).

This field is one in which we have laid off plats and top dressed them with different amounts of lime and fertilizer. The plat one on the right has been treated with mineral fertilizer—at the rate of

24 of phosphoric acid and 50 of potash per acre. The one on the left has received nothing. The upper half has been limed, but we have no definite results as yet to report on the lime. Notice that the right hand plat is closely grazed while the one on the left is poorly grazed.

Every fourth plat is not fertilized. In this slide the plat on the left has been treated with mineral fertilizer—24 of phosphoric acid, and 25 of potash. Here again that the plat on the left having the fertilizer is better grazed than the plat on the right. There is something in the mineral fertilizer that makes the pasture more palatable to the stock.

Plat No. 11 in this slide received a complete fertilizer—6 lbs. of nitrogen, 24 lbs. of phosphoric acid, and 25 lbs. of potash.

The one on the right has 12 lbs. of nitrogen, and one-half as much of the mineral fertilizer as number 11. You will notice that it is grazed off just about half as much as the one on the left. It seems that the larger amount nitrogen has made the rank growth which is apparently less palatable.

Plat No. 16 on the left in this slide has nothing. Plat No. 17, on the right, mineral fertilizer with manure. The difference is very striking; but does not show on the slide to the same extent as it does in the field. Of course, we recognize that where the manure is put on, the cattle will avoid it for the first season, but the next season the grazing will be better.

(Slide).

This slide shows a four years effect of a 7—7—7 fertilizer applied as a top dressing to grass early in the spring. The yields were as follows:

TABLE—FERTILIZERS ON TIMOTHY, 350 POUNDS, 7-7-7 PER ACRE.

Year.	Hay per acre, Llbs.		
	Nothing	Fertilizer	Grain
1909,	886	2,317	1,431
1910,	2,741	4,447	1,706
1911,	2,116	3,371	1,235
1912,	2,499	4,414	1,915
Average,	2,060	3,637	1,577

Here we have the result of an experiment at the Cornell Experiment Station, with timothy three years, then corn, then wheat, then timothy again. Clover did not enter into this rotation.

(Slide).

Plat No. 1 has nothing; plat No. 2, on the left, had 80 lbs. muriate of potash and plat No. 3, on the right, had 320 lbs. acid phosphate. Both fertilizers had considerable effect. The profit per acre for three years, over and above the cost of the fertilizer, was $7.34 net in case of the phosphate, and $12.15 in case of the potash. This is based on a valuation of hay for the first two years at $10.50 per ton, and the last year at $14.50 per ton. The fertilizer was figured

as follows: phosphoric acid, as acid phosphate for the first two years at ten dollars per ton, and the third year at $14.00; potash as muriate, the first two years at $40 per ton and the third year at $46. $45.00 for nitrate of soda for the first two years, and $56.00 for the third year. These figures do not include the extra cost of labor for harvesting the increased crops.

In this slide the left hand plat received nothing, the middle one 160 lbs. nitrate of soda and 320 lbs. acid phosphate. The one on the right 160 lbs. of nitrate of soda only. The net gains per acre for three years was $10.71 and $8.90 for the fertilized plats in the order mentioned.

In the next three plats the one on the left had no fertilizer; to the plat in the middle was applied 320 lbs. acid phosphate and 80 lbs. muriate of potash, giving a profit of $8.46. The plat on the right received 160 lbs. nitrate of soda and 80 lbs. muriate of potash and gave a net increase of $19.94 per acre.

A Member: Was there no difference in the quality of the different plats?

PROF. GARDNER: I can't say; the bulletin makes no mention of a difference in quality.

A Member: At what time of the year is the fertilizer applied?

PROF. GARDNER: In the spring.

A Member: Do you recommend nitrogen for clover?

PROF. GARDNER: No.

(Slide).

PROF. GARDNER: To the middle plat here was applied 160 lbs. nitrate soda, 640 lbs. acid phosphate, and 80 lbs. muriate of potash. On the right, just half as much acid phosphate and the same amount of soda and potash. Gain, on the right, $25.44, and on the middle, $12.52.

MR. PALMER: Is that the yearly profit?

PROF. GARDNER: No; that is net gain for three years.

MR. PALMER: Is the ground supposed to be in better condition after this experiment than before?

PROF. GARDNER: Yes; I will speak of that a little later.

The last slide of the series shows the relative effect of an annual top dressing of manure. The plat on the left received manure at the rate of 20 tons per acre and gave a net gain of $84.59. The one in the middle received 10 tons per acre and made a net gain of $50.62 per acre. Manure was charged at the rate of only 50 cents per ton which, in my estimation, is entirely too low.

In this slide the plat on the left received no fertilizer; the one in the middle received 320 lbs. nitrate of soda, 320 lbs. of acid phosphate and 80 lbs. of muriate of potash. The net gain was $40.76. The plat on the right received the same amounts of soda and potash and twice as much acid phosphate. The net gain was $30.59.

Another slide in which the plat on left received nothing, the one in the middle received 640 lbs. nitrate soda, 320 lbs. acid phosphate and 80 lbs. muriate of potash, making a net gain of $40.50. The plat on right received one-half as much soda and the same amount of acid phosphate and potash making a gain of $35.21.

A Member: Was that twenty tons of manure all applied at the same time?

PROF. GARDNER: All applied at the same time as a top dressing each year.

As I have said a few moments ago, this does not tell the entire story. We find each year an increase in productiveness and the plats that gave the largest yields of hay, gave the largest yields of corn without fertilizer when followed by that crop. I will now leave the matter open for discussion.

MR. LANTZ: In the early part of your lecture, where you showed the difference between the plats that had been treated with mineral fertilizer, and those where other fertilizer had been applied, did you find that the cattle grazed closer where the mineral fertilizer had been applied?

PROF. GARDNER: Yes.

MR. LANTZ: It seems to me that this is an important point. Can you tell me what elements were obtained there that caused the cattle to crop closer? If we know this, could we not apply these elements in larger quantities, or if we do not know, could not this be determined, so that we might apply more of these desirable elements?

PROF. GARDNER: The question of Mr. Lantz is pertinent, but we have made no analyses to determine the point in question. We are only beginning our investigations, and so far we have only taken into consideration the fertilizer, and the influence of that fertilizer on growth of grass and extent to which grazed. The next problem to be solved by investigations along this line will be that of improved palatability, and how to produce it economically. We realize that the amount and cost of fertilizer that can be used on pasture land is limited if we are to realize a profit on it.

MR. KESTER: I find that experiments in hay show that the application of nitrate of soda alone for one year would bring almost as great results as phosphoric acid and potash, but the root growth was not there. It does not tend to develop the same vigorous start as does the use of the nitrogen alone.

PROF. GARDNER: That is a question that I cannot answer. I am not at all certain on that point, but I can, however, confirm what you say about the nitrate of soda increasing the growth of grass more than phosphorus and potash combined. We have gone all the way from all nitrogen to no nitrogen and from all potash to no potash and varying mixtures of the two and three, from all phosphorus to no phosphorus, and where we have used the nitrate of soda as a source of nitrogen with a very little of phosphorus and potash we have the largest growth of grass.

The PRESIDENT: Some one was speaking of having the pasture tramped off. That is something I know nothing about.

A Member: You mean by the cattle. Yes, there is such a thing as having the grass tramped off.

The PRESIDENT: Well, you must have a very limited pasture if they can tramp it off. I don't see how it can be.

MR. PALMER: I have seen it several years ago reduced to one-half.

The PRESIDENT: When were these pastures tramped?

MR. PALMER: After the harvest.

The PRESIDENT: That is tramping down the grass, but I have noticed that several people here object to having their land tramped up.

A Member: The best pasture comes from land that is liberally pastured.

The PRESIDENT: Now here is another point.

MR. HUTCHISON: You refer to tramping pasture, do you not?

The PRESIDENT: We refer to pasture meadows.

MR. HUTCHISON: Our farmers here object to tramping down young clover.

The PRESIDENT: How about the man who asked about pasturing a new clearing in blue grass; are you in a blue grass country?

A Member: Down here in the Cumberland Valley.

The PRESIDENT: Why not put it in timothy and let the blue grass alone? Hey, you fellows, why don't you answer some of these questions? I don't want to do all the talking.

A Member: Isn't it a fact that when a pasture is neglected, Canada thistles grow and fill it up?

PROF. GARDNER: That is one trouble I have been talking about; they are neglected, and consequently become a breeding place for weeds.

A Member: One of the best pasture methods I know of is to mow the grass in July.

PROF. GARDNER: Yes, this is true; and when you turn your cattle into them do not let them graze too heavily for a few years until the grasses are firmly established.

A Member: Did you notice any improvement in the animals where they grazed closest?

PROF. GARDNER: The report referred to states only the gains made and says nothing about the condition of the animals.

MR. BAYARD: Let us go thoroughly into this pasture business. We have plenty of time.

PROF. SEVERSON: Three years ago the Pennsylvania State College obtained a neglected pasture, full of weeds, and beef cows and breeding ewes were placed on it. The ewes grazed on the weeds in preference to the blue grass and timothy. The result was, that by growing the stand of grass has been improved and weeds eliminated.

The PRESIDENT: Now, Mr. Blair, you have had considerable experience with blue grass; tell us about it.

MR. BLAIR: Well, it grows better as it goes on.

The PRESIDENT: The red top does better in a region that has no blue grass?

MR. BLAIR: Yes.

The PRESIDENT: We used to turn our cattle into the pasture in summer, winter them on hay, and next summer turn them into the pasture again. These cattle put on upward from 300 to 425 pounds per head. Do any of you fellows know of any cattle that put on more than 425 pounds on hay and grass alone? It is the best I have heard of in recent years on grass alone. The best carload of cattle I have seen had no corn, only grass, and brought $10.00 on cars at Pittsburgh.

A Member: Have you any pasture in winter?

The PRESIDENT: Just a little.

A Member: How many acres are there in your pasture?

The PRESIDENT: I don't know; how many acres in your field over there Mr. Munce?

MR. MUNCE: About twenty-five.

The PRESIDENT: And you put eighteen heifers on it, do you not?

MR. MUNCE: About that.

The PRESIDENT: The trouble is that we have not tried to build up our pastures. Put on your blue grass seed and your red top and your timothy seed, and let them grow, and your pasture will grow better as time goes on.

A Member: Pardon me, did you say twenty-five acres or one hundred and twenty-five?

The PRESIDENT: Twenty-five; and it is some grass, I assure you.

A Member: Does he top dress it?

The PRESIDENT: No, nothing; it has always been pasture. How long has it been in pasture, Mr. Munce?

MR. MUNCE: About sixty years.

The PRESIDENT: Yes, and it will grow better if it is there a hundred years.

PROF. TOMHAVE: In England they find that the pasture is better at the end of forty years than it is at the end of twenty years; in fact, the longer it is left in pasture, the better it is. There is a lot of land in this country that should be in pasture, that is under cultivation, and it would give us better returns in pasture.

The PRESIDENT: Anybody here who saw our herd at the fair this year?

PROF. TOMHAVE: I saw it at Washington.

The PRESIDENT: All those heifers had single calves this year, and while they were not in extra find condition, they were in excellent condition.

PROF. TOMHAVE: I want to emphasize what Mr. Bayard has said. I was at the Washington fair and saw them there. They were not fat, but were in fine condition, and had as much fat as any man would want in his breeding herd.

MR. KESTER: How did they stand fair week without pasture?

The PRESIDENT: Very well. They will, however, stand it better in a dry season than in a wet season.

You have all heard of the famous blue grass of Illinois, but you can not put on as much flesh on that as we can with our Pennsylvania grass. Here in Pennsylvania and in Old Virginia and West Virginia, we can fatten cattle on our blue grass. They do that down in your country, McSparren, don't they, and do it well?

MR. McSPARREN: They go further; they finish on blue grass.

The PRESIDENT: That is what good grass will do.

MR. MUNCE: We are in one of those localities where the natural blue grass will grow. When we start a pasture, we put it in timothy and clover, and then the blue grass will come in naturally and cover the ground like a carpet. We have one field there that has never been plowed. It has been in the family for sixty-five years. I remember it for fifty years myself, and I know that it has never been plowed in that time, and my father said it had never been plowed before. It has always carried a very large number of sheep and cattle, but the last few years something seems to have gone wrong with it. It seems as though a grub worm has gotten it, and you can roll it up by the yard, like a fleece of wool. In another section, it seems as though some weed or something had gotten into it. I think something should be done, but I don't know what to do. Perhaps some of you people could help us. As I said before, it has been in blue grass for sixty or sixty-five years, and three years ago it began to go down. Last summer it began to come back, and this summer it has come back pretty good.

In addition to this we have ten acres, on which we have kept 160 sheep, and I never saw sheep improve in my life the way these did. They came in in August ready for Prof. Tomhave and his knife.

I don't know whether this pasture needs lime, or what. There comes a time when it seems as though something must be done in the blue grass region. It is a long time coming, as a rule, but it seems to have come with us.

We have a number of blue grass fields in southwestern Pennsylvania, and we find that if you husband your pasture a little, you can winter your sheep on the blue grass pasture. We give them a little corn, but no hay, and they keep up and improve. We have had them come up with very little hay and about half a bushel of shelled corn per hundred, and put on one hundred pounds by May.

PROF. GARDNER: I believe there are times when a pasture should be plowed up, and this comes to be one of the times to plow it up, and put it in something else for a year or two, and then back again in pasture.

The PRESIDENT: I wouldn't agree with you at all.

MR. MUNCE: I would rather think of cutting out some of my insides. I would not think of plowing it, but I want to do something to help it.

The PRESIDENT: Another question that comes up is that of fertilizer on grass. Would it do to use dried blood instead of nitrate of soda?

PROF. GARDNER: That is one of the questions that is still open. We know what nitrate of soda will do, but we do not know as yet what the dried blood will do.

The PRESIDENT: I have used them both. I used the nitrate of soda one year, and the dried blood the next.

A Member: What is the difference in cost?

The PRESIDENT: I don't know. Some of these Professors round here might be able to tell you.

PROF. GARDNER: Not very much. It might be to your advantage to mix the two.

MR. MUNCE: Another thing about that pasture of ours. Sorrel came in there, and according to the authorities, that would indicate sour land. I have not been able to get the county agent to take a look at it; the other fellows are using him so constantly that I have not had a chance at him; but I do not see how it would be possible for that permanent pasture of ours to become sour. Perhaps some of these Professors could tell us.

The PRESIDENT: I don't know that there would be an advantage in using dried blood over some of the other things.

What about turning the cattle from one pasture into another? Who knows anything about it? I imagine it might be all right for the pasture but not for the cattle.

A Member: Good for both.

A Member: Perhaps they get more to eat in another pasture after they have grazed awhile in one field.

A Member: I don't know about that. I have known them to leave a good, fresh, juicy pasture, and seem to enjoy better a rough hard soil.

A Member: I don't know what the reason is, but I find that I get better results from changing the cattle from one pasture to another, than I do by leaving them in one field.

The PRESIDENT: Still, you have not proved it to your own satisfaction. My experience has been that the cattle thrive better if left on one pasture.

A Member: We do not waste our time on beef cattle in our part of the State; we have dairy cattle. Perhaps that may have something to do with it.

PROF. GARDNER: At the Virginia Experiment Station, alternate grazing was found of doubtful value, at least very little difference was found in the gain of the animals.

A Member: Is it not possible that the animal, as well as the human, is better for a change? I have cows that will neglect their own feed to go and steal their neighbors', even when it was no better.

The PRESIDENT: You fellows steal the milk from the cow on both sides, too.

A Member: That is the way you get your big yields.

The PRESIDENT: Yes; that's so.

MR. GORHAM: I am very much interested in this pasture question. How much pasture land shall I allow per cow? Can some one tell me? Then another thing; most of you people talking come from a blue grass country; I get a good many questions from Brother Bond's country—up in Potter county—where they have the Volusia soil, and they want to know how to get a pasture started in that country. And also as to taking care of those already started. How are they to care for them?

MR. BAYARD: Don't you think that possibly sweet clover is a solution to your problems?

MR. GORHAM: I believe that is quite possible.

The PRESIDENT: Have you ever given it a trial?

MR. GORHAM: No, I have not.

The PRESIDENT: Is Mr. Gooderham in the house? He has made some. I would like you to make a few experiments on this rough soil with sweet clover and give us the benefit of your experience.

MR. GORHAM: And let it reseed itself?

The PRESIDENT: I don't know much about it, but I have had this bee in my bonnet for some time.

A Member: I have wondered whether it would grow on the steep mountains I have seen it at Wilkes-Barre, along the Susquehanna, and have wondered whether it could be grown on the mountain.

A Member: I have noticed it growing along the B. & O. in the southern part of the State.

A Member: That is limestone soil; I am talking about soil that has no lime in it.

MR. NORTON: At Pittston the sweet clover will grow as high as your head on land that is practically worthless. There is land, not only in northwestern Pennsylvania, but in southwestern Pennsylvania, and all over the State, not only a few acres, but millions of them, that is practically worthless, but which can be reclaimed, and should be reclaimed and made productive. They cannot grow blue grass; it will not hold. The sweet clover will hold better than anything else, and it might be used in trying to reclaim these lands.

The PRESIDENT: Has anybody any of this land that they will be willing to turn over to the Experiment Station for experimental purposes?

MR. GORHAM: I can get hold of hundreds of acres of this kind of land, and I believe it is a question of livestock and getting this land into shape. It is not a strong soil, but it is a more level country. We get good hay from it and have sold it for a number of years. It is a good potato soil, but hauling the potatoes to the station several miles away is expensive; it is also a good fruit soil, but there also comes in the question of expensive transportation.

A Member: How about plowing the sweet clover? I tried it without much success.

The PRESIDENT: It takes rough, stony ground to grow it successfully.

A Member: Yes. I believe that.

A Member: The first time I ever saw sweet clover was in New York State. They had dug up the soil to build a railroad, and a splendid growth of sweet clover came up in that soil.

The PRESIDENT: My attention was called to sweet clover by a gentleman from Kentucky; he said their land had eroded, and sweet clover saved it for them. I believe that we should give it a trial on these rough, stony hillsides.

MR. NORTON: Up in the Syracuse region, where they grow so much alfalfa, clover is a nuisance. Now, that soil has a gravelly sub-soil. Our people up in Susquehanna and Wayne counties are looking for a solution of this question, but so far have failed to find it. White clover has been the best so far.

The PRESIDENT: Alsike?

MR. NORTON: No good.

The PRESIDENT: Now I wish some one would put a piece of land at the service of the Experiment Station—preferably some one who can afford to pay the expense of the experiment, as the Experiment Station will be short of cash.

A Member: What is the sweet clover worth after you have it?

The PRESIDENT: I don't know; but I do know that some people feed it to their cattle instead of hay.

A Member: I know some that do not.

The PRESIDENT: Mr. Munce, tell us how you manage that permanent pasture.

MR. MUNCE: Well, we put the cattle in and let it grow; that's all.

MR. GORHAM: Do you get the weeds and thistles in?

MR. MUNCE: No; occasionally we get the mullen or some other weed, but we go over it with the mowing machine, and soon get rid of them.

PROF. GARDNER: I believe that what the farmer needs to do is to sow the best seed for his particular soil, and use a greater variety of grasses. There is alsike and red and white clover. Alfalfa, blue grass and orchard grass; try them, or a mixture of them, and gradually you will be able to ascertain for your community the grass best adapted to it.

MR. MUNCE: For several years we have been using a little alfalfa; I also use the red and white clover, and orchard grass, but find it tough; in one of my fields I have half a mile of alfalfa. It is in patches all over the field. By experiment in this way, I believe we will gradually solve one of our greatest problems.

A Member: If you were reseeding, would you plow it the first year?

MR. MUNCE: I would be governed by what the seed looked like.

A Member: If you were preparing it for pasture, and it did not look as heavy as it might, what would you do?

MR. MUNCE: We never leave our cattle on a light pasture; we let it grow pretty heavy.

The PRESIDENT: I have about got you fellows wound up, and if all the other organizations join and make one great, big central organization, we will accomplish something.

Now, you fellows, is the time to pay your dues. Mr. Lantz and Prof. Larson will take your money.

PROF. LARSON: Yes, and we'll let no man escape.

The PRESIDENT: We will have to go on to dinner now; suppose you are all ready for it after this discussion, and we have an interesting program this afternoon, so get back here when you've had your dinner.

Adjourned until 1.30 P. M.

Wednesday, January 23, 1915, 1.30 P. M.

Mr. Norton in the Chair.

The CHAIRMAN: Please come to order. The first thing is a lecture by Prof. Putney, of State College, on "Feed Selection." I want you all to feel free to ask him questions. That will bring out points that might otherwise be overlooked. I have the pleasure of introducing to you Prof. Putney.

Prof. Putney spoke as follows:

FEED SELECTION

PROF. F. S. PUTNEY, *State College, Pa.*

Gentlemen, and Members of the Breeders' Association: The topic on which we are to speak this afternoon is Feed Selection. It is a a hard thing to teach an old dog new tricks. I have been talking on feed selection for the past year and a half, and it has occurred to me that I might talk of something you are not interested in. The time this afternoon, is to be equally divided between the next speaker, Prof. Thorne and myself. I will talk to you for a little while, and leave a part of the time open for questions, so that you may also get what you are interested in.

We are a poor excuse for farmers unless we make some provision for our families. Every farmer has a right to store up something for his old age, and to provide for his family as he goes along. So the farmer has a right to make some money, and one of the ways he can make it is in the matter of feed selection.

I have here a chart prepared by Prof. Noll, and it has occurred to me that I might use it, which you will notice, shows the results of a thirty years' rotation of corn, oats, wheat and hay.

AVERAGE ANNUAL VALUE PER ACRE OF CORN, WHEAT AND HAY, GROWN IN A ROTATION FOR THIRTY YEARS.

	Digestible protein, lbs.	Energy value, therms	Farm value per acre, dollars
Corn,	200	2,124	$28 68
Oats,	121	1,175	14 34
Wheat,	115	1,352	18 72
Hay,	133	1,221	17 18

You will notice that corn produces the largest amount of digestible protein, and gives us the largest value per acre, as well as the largest amount of energy. It is good practice to look for the largest amount of nutrients per acre in the selection of our feeds that we raise on the farm.

Now, one of the points to bear in mind is that there is no energy in the cow herself. She is simply a machine that makes energy from one feed or another. Proper feeding comes from the proper selection of your crops. This means that the farmer should grow the crop that will give him the most energy, and the best value.

The following table from Bulletin 114, of the Pennsylvania Experiment Station, shows us what becomes of the feed eaten, and the result when the cow is fed too much, and also when she is fed too little.

WHAT BECOMES OF FEED EATEN.

WHEN FED TOO MUCH

Maintenance.	Production.
1000 lb. cow.	20 lbs. 4% milk.

WHEN FED JUST ENOUGH

1000 lb. cow.	20 lbs. 4% milk.

WHEN FED TOO LITTLE.

1000 lb. cow.	10. lbs. 4% milk.

The first section of this shows what happens when she is fed too much; the middle diagram when she is fed just enough, and the lower one, when she is fed too little. The animal takes care of herself first; that is natural; and when she is not fed enough to take care of herself and produce milk, her production goes down. Self-preservation is the first law of nature, and motherhood is often a stronger motive. A cow produces milk because she expects to take care of her calf and raise it. After she has fed the calf, if fed sufficiently, she will put on fat against the time when she may need it. It is the same with us. Nature provides for all animals in the same way.

Now, what can we feed the animal to provide for her, and to provide for production, and in case of young, to provide for them? First, something succulent. We know that when we put that cow out on grass, she will increase in production if she is a milk animal, or in fat, if she is a flesh animal. Then in winter we can feed silage, from twenty-five to forty-five pounds, carrots, turnips, rutabagas and beets. Silage can be raised cheaply. Roots are rather expensive. Potatoes affect the butter fat, and other things have various other effects. Dried beet pulp is good. They can be moistened, so as to be palatable to the animal and make a fair substitute for a succulent feed.

This chart shows the relative value of the different feeds in the matter of producing protein or energy.

COST OF PROTEIN AND ENERGY PER WEIGHT.

	Price per ton	Net pro., lbs.	Cost in 100 lbs. pro.	Net en. & pro. 100	Cost 100 therms of energy
Corn stover,	$2 50	1.80	$6 94	26.53	$ 47
Silage,	3 50	.88	19 88	16.56	1 06
Clover hay,	14 00	5.41	12 94	34.74	2 01
Mixed hay,	18 00	3.73	21.44	34.15	2 34
Corn,	20 00	6.79	14 70	88.84	1 12
Ajax,	30 00	21.93	6 85	79.20	1 89
Cotton-seed meal,	32 00	35.15	4 55	84.20	1 90
Gluten feed,	28 00	19.75	7 02	79.32	1 76
Oil meal,	36 00	27.54	6 53	78.92	2 28
Bran,	24 00	10.21	11 75	48.23	2 48

You will notice that corn stover is one of the best feeds, and a cheap source of energy. Three to four pounds per day of corn stover is sufficient. Then comes clover and alfalfa; these are ideal, and every farmer should have one or the other. If you feed silage from twenty-five to thirty pounds, as I have suggested, corn stover from three to four pounds, corn from three to four pounds, and top off with hay, from four to seven pounds, you will have an excellent mixture. If it is timothy hay that our cows are called upon to eat, about five pounds will be sufficient; if it is alfalfa hay, it would be about seven pounds. Clover hay, it would be about six pounds. It is like with us; if their feed is palatable, they will eat more of it. These grain mixtures are usually selected with different purposes in view; first, to produce the cheapest form of energy; the second, to produce the cheapest form of protein; the third is variety, and the fourth palatability. In a general way, we must say that the four grains produce the best results, because the cow likes the variety and will give the best returns.

The prices on this chart are not necessarily correct for the present time. Prices are probably higher today than they were when this chart was prepared, but you can easily figure out the ratio for yourselves. It is not primarily the cost of a ton but it is the cost of 100 pounds of protein and 100 therms of net energy which determine the true cost of a feed.

You will note by this chart that the cheapest form of protein is in cotton-seed meal; and the cheapest form of energy in the corn stover, but out here you will find that the very cheapest is corn at $1.12. Corn and corn stover are the cheapest forms of energy at these prices. The second one on the list is silage. The three forms of corn are the cheapest source of energy.

Now, then, what shall we have for bulk? Here we have bran at $24, and Ajax at $30. Wheat bran seems to have more feeding ratio than the protein and energy given on the chart would indicate. Then we must look over the chart to see what we need for variety. There is gluten, which furnishes protein cheaply, but energy at a higher

price. It is necessary to keep the cows' bowels in proper shape, and for that purpose, both these feeds work every well.

Most of you are familiar with Bulletin No. 114, of the Experiment Station, on the "Computation of Daily Rations," which covers this subject thoroughly. What I am saying this morning is more in the form of a few points for you to carry home and think over.

In the winter time, when you want the best results, you will have to feed some succulent food, some roughage, for bulk, and some concentrates. Coming down here on the train this morning, I heard two farmers discussing the question of feed. I heard one of them say that when he fed silage, he never fed corn in his grain. Now, the chances are that that man is making a mistake, because corn is probably his cheapest source of energy. Largely because his corn in the silage is no reason why he should not have some in his grain. It is estimated that three pounds of silage equals in value one pound of hay; in feeding the ordinary cow six pounds of clover hay, and thirty pounds of silage, is equal to fifteen pounds of clover hay. In addition, a succulent food produces an additional flow of milk. It is worth while to study the value of the different feeds in composition as well as in dollars and cents. During Farmers' Week, so many men spoke of the value of them of wheat bran, but in figuring it out, I found that many of them were feeding a ration that was deficient in ash. This subject of ash is one that most of use have given very little thought to. Now, all feeding stuffs consist of water and dry matter. as you will see by this chart.

ALL FEEDING STUFFS CONSISTS OF

- Water
- Dry matter, ...
  - Ashes and inorganic matter
  - Organic matter .....
    - Protein
    - Fat or other extract
    - Carbo-hydrates .....
      - Nitrogen free extract
      - Fibre

Now, we may think that so long as the animal gets enough water, it will be all right, but as a matter of fact, if we feed it in form of succulence, we get better results. In dry matter, when the animal burns it, it gets some ash. Now, if we multiply per cent. of nitrogen by 6.25, we get the protein.

In a properly balanced ration, the animal gets water, the right amount of protein, fat and nitrogen for extract.

I think it would be well to look for a moment at the following chart. This chart shows the percentage of water in the different feeds. The first column represents the minimum amount, and the second the maximum.

AVERAGE PRECENTAGE OF WATER IN THE DIFFERENT FEEDING STUFFS.

	Minimum	Maximum
Oil-bearing seeds,	7	10
Oil by-products,	6	11
Cereal grains,	8	13
Mill by-products,	6	15
Mill products,	7	15
Straws,	7	15
Leguminous seeds,	11	15
Leguminous hay,	5	21
Non-leguminous hay,	6	28
Packingbouse by-products,	6	34
Stovers and fodders,	30	52
Pasture grains,	61	81
Leguminous pastures,	71	85
Silage,	50	90
Roots and tubers,	66	92
Milk and milk by-products,	74	94

Frozen corn, in order to make the best silage, should be moistened. Theoretically, you could make an old, sour silage; practically, it works out all right, so far as my experience goes. Put on all the water you want, and it will be all right. If it does not seem to have a proper effect on the bowels, a percentage of linseed meal might be fed with the silage to keep these cows in a good condition. We tried it at the College this fall, and we found we had to increase the linseed meal in order to keep these cows in good condition.

Chart No. 6, which we will now look at, shows the amount of crude protein in the different feeding stuffs.

AVERAGE PERCENTAGE OF CRUDE PROTEIN IN THE DIFFERENT FEEDING STUFFS.

	Minimum	Maximum
Roots and tubers,	1	3
Pasture grains,	1	4
Milk and milk products,	1	4
Straws,	3	5
Silage,	1	6
Stovers and fodders,	2	6
Leguminous pastures,	2	6
Cereal grains,	7	12
Non-leguminous hay,	5	16
Mill products,	7	18
Leguminous hay,	10	18
Oil-bearing seeds,	16	23
Mill by-products,	2	34
Leguminous seeds,	20	34
Oil by-products,	16	48
Packinghouse by-products,	21	84

On an average you will find that a feed rich in one ingredient will be poor in all the others. It is the same with men. We cannot hold more than just so much. If rich in one thing, we will be deficient in the others. Therefore it stands to reason that if the feeds we grow are deficient in protein, we must buy it. This chart shows that those products that are high in water are low in the other elements.

Here on chart No. 8, you will see the average amount of nitrogen free extract in the feeding stuffs.

AVERAGE PER CENT. OF NITROGEN FREE EXTRACT IN THE DIFFERENT CLASSES OF FEEDING STUFFS.

	Minimum	Maximum
Milk and milk by-products,	4	5
Packing house by-products,	..	7
Leguminous pastures,	5	14
Pasture grasses,	7	29
Oil-bearing seeds,	21	25
Silage,	7	26
Roots and tubers,	5	30
Stovers and fodders,	20	37
Oil by-products,	14	39
Leguminous hays,	30	44
Straws,	34	47
Non-leguminous hays,	25	55
Leguminous seeds,	28	55
Mill by-products,	35	67
Cereal grains,	59	75
Mill products,	67	78

Wherever we get a great many cell walls, we are getting a great deal of fibre. Think that over, and you will see that I am right.

Now, I notice the time is going fast, and I will simply call your attention t othis last chart, in order that we may have time for discussion.

CHART NO. 10

MINERAL MATTER IN 1,000 LBS. OF REPRESENTATIVE FEEDING STUFFS.

Name of feed.	Total ash, lbs.	Potash, lbs.	Soda, lbs.	Lime, lbs.	Phos. acid, lbs.
Corn,	15.0	5.7	0.2	0.3	7.1
Wheat (winter),	18.0	8.7	0.4	0.6	5.5
Oats,	32.0	4.8	0.5	1.2	7.8
Barley,	25.0	4.8	0.6	0.7	7.9
Wheat bran,	58.0	15.2	0.4	1.7	26.9
Linseed meal O. P.,	55.0	13.7	0.8	4.6	6.88
Cotton-seed meal,	66.0	15.8	....	....	5.48
Pea meal,	26.0	9.9	0.3	1.3	0.24
Dried brewers' grains,	37.0	2.0	0.2	5.2	12.27
Malt sprouts,	61.0	19.9	1.1	1.7	13.46
Corn stover,	34.0	10.9	6.5	4.3	9.10
Timothy hay,	44.0	14.2	0.8	3.5	14.15
Red clover hay,	62.0	18.7	1.2	21.6	1.67
Alfalfa hay,	106.0	17.9	1.9	43.1	10.11
Cow pea hay,	142.2	14.7	2.5	12.7	....
Wheat straw,	42.0	6.3	0.6	2.4	28.35
Oat straw,	51.0	17.7	1.7	3.6	28.81
Corn silage,	21.0	3.7	1.0	2.8	....
Mangels,	11.0	3.8	0.4	1.8	0.22
Rutagagas,	12.0	4.9	0.7	1.4	0.13

Most farmers claim that wheat bran at any price is the cheapest feed. But you will notice that we have here quite a number of feeds, and that corn is cheaper than wheat bran. Another man will say that

dried brewers' grains is the best feed; and another red clover hay; but look at the alfalfa hay and at the cow pea hay. In one experiment wax cotton seed meal was fed for the effect on the butter until the cows got the ricketts and they had to stop it and put in some ash. These are all things that should be considered in our feed selection, particularly where the cows do not get out to pasture, as is the case at State College. We have some cows there that have not been out in pasture for nine years, and yet we have kept them healthy.

The CHAIRMAN: Ask questions, gentlemen; don't be backward.

MR. HEATH: The Professor says cottonseed meal is deficient in lime. Now, I have plenty of bone meal. How would that do with a grain ration?

PROF. PUTNEY: All right. If you notice anything not quite right, add a little lime. They simply must have mineral matter.

MR. GORHAM: What do you think of raw rock phosphate as fed to cows?

PROF. PUTNEY: We have had some little experiment, and it has worked out all right. But if you look over this chart, you will see that by using dried brewers' grains you stimulate the milk production, but if you use the phosphate you simply stimulate the growth of the animal, the same as it does in plant life.

MR. LANTZ: How much phosphoric acid do you supply by increasing the lime?

PROF. PUTNEY: That is increasing the lime.

MR. LANTZ: My own method is to finish with lime, and not with phosphoric acid.

PROF. PUTNEY: If you will look, you will find that many of these feeds on the chart are deficient in lime, and it must be supplied.

MR. LANTZ: Lime water is usually given them.

A Member: What about feeding molasses—pure cane molasses?

PROF. PUTNEY: It will have the same effect in keeping the bowels open. Molasses can be substituted for the linseed meal as a laxative. There is no reason why it should not be fed.

The CHAIRMAN: Has your experience been that molasses will increase the flow of milk?

PROF. PUTNEY: Yes; anything that will keep them lax will increase the flow of milk.

The CHAIRMAN: In a great many certified milk dairies it has been thrown out.

PROF. PUTNEY: Well, we know the effect that these feeds will produce.

The CHAIRMAN: Is it not a fact that wheat bran is of more value than anything else as a feed?

PROF. PUTNEY: At the Ohio Experiment Station they are now experimenting with ash, and in a few years we will probably know more about it than we do now.

A Member: How many pounds of silage can a man feed a dairy cow without making the milk taste?

PROF. PUTNEY: Anything that will affect the milk, like turnips or silage, should be fed after milking, or three hours before. If the cow eats forty pounds of silage, add to it forty pounds of roots. In Europe they feed forty to eighty pounds. I would suggest thirty to forty pounds. You will find that the silage contains more protein them the roots, but so little that it is practically nothing more.

The CHAIRMAN: Any more questions? If not, we will proceed with the next subject.

PROF. LARSON: Just a moment please. The butter makers and market milk men are asked to meet in this room at 3.30 this afternoon.

The CHAIRMAN: There will be a joint meeting in the room above to hear Prof. Thorne, so we will have to cut our program short. This evening there will be a meat demonstration by Prof. Tomhave; I hope you will all be present.

Tomorrow morning at eleven o'clock there will be a meeting of the men interested in forming a Jersey Breeders' Association. In the western part of the State they have a Jersey Breeders' Club, but what we are trying to organize is a State Association of Jersey Breeders.

We have a telegram from Dr. Gay, saying that on account of sickness he is unable to be present with us this afternoon. Instead, Mr. Gorham, who was to have talked to us this morning, will now talk to us on "Herd Management." I have the pleasure to introduce to you Mr. Gorham.

Mr. Gorham spoke as follows:

HERD MANAGEMENT

By W. R. GORHAM, *Muncy, Pa.*

In the short time allotted to this subject, I could not cover it, and I could not begin to cover it anyhow, so it will not matter much. I could not begin to tell you in the short time much about herd management, but perhaps if we get together in a little discussion, we may be able to learn something. I will only take up a little of your time, and leave the balance open for a discussion of the subject. I will not attempt to go into details.

I will assume that you are, or have been, in the dairy business for some time, and have selected the type of cow best adapted to your purpose, and to your conditions, and that you are successfully producing market milk. What I have to say is based on my own experience, and

I have nothing phenomenal to relate. I will also assume that you have the proper facilities for producing that milk successfully, and a stable properly arranged to do the labor that is required on a dairy farm; that the platforms are the right length, the gutters the right size, and the walks the right size; that the hay chutes are convenient, and that the mow is convenient for proper use, and that you are supplying your cow with a proper ration—a mixed or "balanced" ration, and one that will give you the best results and that you have a proper market for your product. Now, assuming that you have all these things, perhaps you will say that there is very little left for me to talk about on the subject of herd management. This may be true, and yet there are a number of things that may properly come in under the term "Herd Management" that are not mentioned in these just enumerated, and these I will call to your attention briefly.

The first is, the handling of labor on the dairy farm. My experience is, that I prefer to have the man who tends to the herd do nothing else. I know a great many men on big dairy farms will have a man work part of the day on the herd and part of the day on something else. I believe for most efficient work a dairy should be large enough to take up one man's time, and one man should be held responsible for the care of it. The advantages are that there is no loss of time in changing from one job to another, and you can use that time to advantage. Then, again, the man who spends all his time in coming for the cows will understand better just what to do in an emergency, and will keep things cleaner and more properly cared for. The same thing can be said of the work upon the farm.

I also wish to call your attention to the value of regularity in working with the cows, such as milking and feeding and watering, and the importance of a properly balanced ration.

Another important point, which I think is not properly emphasized, is the care of the manure, and the use of it. The question of taking it out every day is one that must be decided by each man for himself. It depends largely upon the labor and conditions under which it has to be done. I believe you get more value from it on the field, but the question of labor may overbalance the gain. I don't believe it pays to hitch up and haul out one load of manure. There is much lost time. Have a pit to put it in. In using manure, I believe our greatest benefit comes from top dressing it on wheat or young hay or clover. Some seasons of the year I find a great deal of trouble in getting it on the field. This winter, for instance, the ground has been soft, with much snow spread over it, and the manure has had to be stored in the barnyard, but, as I say, I believe the greatest benefit comes from using the manure as a top dressing on wheat or young hay or clover.

Then comes the matter of weighing and testing milk. I believe in weighing the milk every time, and keeping a record, and crediting every cow with the milk she gives. Most of you are older dairymen than myself, and probably you are not doing that, but to me the keeping account of the production of each cow and the feed she consumes, is a part of the management of the herd. Personally I believe it costs from a hundred to a hundred and twenty-five dollars a year to keep a cow, and if she does not produce more than that, in milk or butter, she had better be passed on to the butcher. It is the only way to be sure you have a good cow, and one that pays for herself.

Now, as I said before, I will only touch on these high points, and I wish you would ask questions, because I think we will get more out of this discussion than in any other way. I was particularly interested in this discussion on pastures this morning, and I think that is one of the most important in the management of a herd. There is nothing that will produce milk as cheaply as good pasture. Then there is also clover; and roots have a high value. I find a three years' rotation of corn, wheat and clover hay very satisfactory, and I also believe in having a section in alfalfa. I imagine that under certain conditions a four year rotation would be just as satisfactory, so that we may have one cash crop of corn or wheat or hay to sell. That is something that has to be worked out by the individual farmer. The price of labor and material comes in. In my own case, I have the question of herd management worked down to a very simple point. One man takes care of the herd, another of the farm; the question of fertilizing has also been reduced to a very simple process, lime every other rotation, and chiefly acid phosphate outside of the manure, and I find the yield per acre is gradually increasing from year to year, so that I have no reason to think I should make any change.

Now, as I think there must be a great many points to be discussed, I will leave the balance of the time for questions.

The CHAIRMAN: Don't be afraid to ask questions, gentlemen; we have not very much time, so don't hesitate, but keep things going.

A Member: Use nothing else but rock?

MR. GORHAM: Sometimes in past years I used nitrate of soda or a 2-10-8 fertilizers, but since I have been growing clover I do not find it necessary.

DR. HAVILAND: Is it necessary for the herd to have exercise?

MR. GORHAM: I don't know as it is absolutely necessary, but I think the health of the cattle is kept up better if they are allowed to take exercise; there are people with cows that are kept in the barn for six months from fall until spring, but I prefer mine to get out and exercise their muscles.

The CHAIRMAN: So you think a cow that is allowed to exercise from spring until fall, it will be sufficient?

MR. GORHAM: Yes, I do, but that plan has its disadvantages.

The CHAIRMAN: What is your production?

MR. GORHAM: About eight thousand to eighty-five hundred.

A Member: What breed?

MR. GORHAM: Holstein-Friesian goods.

A Member: How many in the herd?

MR. GORHAM: About thirty.

A Member: And one man takes care of thirty cows?

MR. GORHAM: Yes, but he has two boys about twelve and fourteen years old who do a lot of the light work. I follow the system of paying him a rate per cow.

PROF. LARSON: How long do you figure a cow should rest each year?

MR. GORHAM: I figure on having them rest six to eight weeks. I would rather not have a cow go dry than not have her rest at least six weeks.

The CHAIRMAN: Do you keep your calves in close confinement?

Mr. GORHAM: No, they run in and out of the yard practically all winter and summer. We try to give them plenty of silage and hay. Our calves are given hay and silage when only two weeks old.

A Member: What grain do you feed?

MR. GORHAM: To cows or calves? I like corn and oats the best of anything I have used.

A Member: Cottonseed meal?

MR. GORHAM: Just a little at times; I don't want them foundered.

A Member: No division of labor, and only one herdsman? What is his work?

MR. GORHAM: Well, he has charge of the cows, and feeds and curries.

A Member: Himself.

MR. GORHAM: Yes; he feeds and waters the cows and curries them; takes the milk to the station and takes care of the calves. Of course, his wife and two boys help him in the lighter work. But of the thirty cows there are usually about 25% dry.

The CHAIRMAN: What flooring?

MR. GORHAM: Plank.

A Member: Do you clean your cows every day?

MR. GORHAM: Practically; once in a while, every other day.

A Member: You pay so much per cow—on the piece work basis?

MR. GORHAM: Yes.

A Member: What does he get? How much does it cost you?

MR. GORHAM: About two dollars—I pay a dollar sixty per cow per month house rent and some extras. The herdsman's salary ranges from $40 to $60 per month. Sometimes my herd gets a little low, as I sell off some cows; again I buy cows, and it runs up.

A Member: Do you board the man?

MR. GORHAM: No; but I supply the house.

A Member: Don't you think you have a bargain in a man, his wife and two boys for sixty dollars?

MR. GORHAM: Well, he says it is the best job he ever had.

A Member: Have you many of these men in your section?

MR. GORHAM: No; I can't say that we have.

A Member: If you have, I'd like to get three or four of them.

The CHAIRMAN: What method have you of tying your cows?

MR. GORHAM: Stanchions.

A Member: What do you feed your heifers before they calve?

MR. GORHAM: Some silage and clover hay.

A Member: Any trouble from that?

MR. GORHAM: I get the doctor about twice a year, mostly for little hurts, though.

The CHAIRMAN: How do you treat your heifers before they drop their calves?

MR. GORHAM: We treat each one a little different although they don't vary very much. If the herdsman thinks they need a little extra grain, he gives it to them, but as a rule, they don't need anything but silage or hay.

A Member: No grain?

MR. GORHAM: Not as a rule. If they are not in good condition we may add a little grain, but we turn them out as soon as possible, and as a rule, they don't need it.

A Member: Do you say you feed them milk the first few months?

MR. GORHAM: Yes.

A Member: Do you say you do not feed any of your dry cows grain?

MR. GORHAM: Yes.

A Member: Do you say you have a dipping place for your cattle?

MR. GORHAM: No; I sometimes wish I had, but I hardly think it is necessary enough to go to the expense. We use the spray. Once they got lice from the chicken pen.

A Member: What did you do for that?

MR. GORHAM: Sprayed with a solution of creolin and crude oil.

A Member: Do you prefer to have your calves come on in the spring or fall?

MR. GORHAM: Any time the year round except the two hot months of July and August. I try to have them come along before the middle of July or after August. I try to have a uniform supply of milk the year round.

The CHAIRMAN: Do you supply your customers the year round?

MR. GORHAM: We supply the Williamsport Hospital—I would like to hear from some of you people on the use of manure. Have you had any experience with it as a top dressing?

The CHAIRMAN: It seems that at the Scranton Correspondence School— they have six acres just across from where I live the last five years, there results are better, and they raise four to five tons of hay per acre; this year it was over four tons. It was put on in the fall, and then the sod plowed down. It was also manured after it was seeded. In all their experience—I think you will bear me out if there are any I. C. S. men here—I think they had better results in putting it fresh on the field.

MR. GORHAM: If you have enough to keep a team and man busy, it may be all right, but I hardly think it pays to hitch up and haul out just one load of manure.

PROF. LARSON: This is one of the most important subjects to be discussed here, but as we will have the best authority in the country talk to us about it tomorrow, I think perhaps we had better postpone the discussion of this subject until that time.

A Member: Most of you men here have spent enough on commercial fertilizer in the last twenty years to buy a farm, and have allowed the manure to lay round for two weeks or more; in that way you get only half the benefit. Spread it at once, and save your commercial fertilizer.

The CHAIRMAN: Mr. Byers is a crank on the open air treatment of calves, and I have seen the calves out with the thermometer 20 degrees below. Some of these cows never saw the inside of a stable until they dropped their calves. One of these cows won the world's record. The one was never taken in longer than from four to six weeks, and the other only for ten days, to drop her calf. I agree with Mr. Byers that in order to have good, strong calves, it is necessary to have fresh air. These calves raised outside take no more feed than do those in the stable, even in the cold atmosphere. They have the most perfect building I have ever seen in the way of a stable in all my travels, and anytime you are in the vicinity of Scranton, you will be welcome to call and see it. I am not connected with the school, but I know you will be welcome. They are experimenting with the brick and block floor. I told my son the other day that I would put a thermometer down there and see what the difference really is, because there is a decided difference. I suppose the wood pavements will solve the problem in time.

MR. GORHAM: I agree with Mr. Norton on raising calves outside. Once or twice in very cold weather, the boys took them inside last winter, but as a rule they are kept outside.

PROF. PUTNEY: It may interest you to know that for the past five years we have been conducting an experiment with cows kept outside; a record is kept of the production of the cows kept inside, and those outside. When you look at the records, you will find that the cows kept outside in an open shed, closed on three sides, do practically as well as those kept inside. Now in our new barn, which is well ventilated, we will repeat the experiment, and so far the cows outside are doing as well as those inside.

The CHAIRMAN: Don't you think it would be pretty hard to get a man to go outdoors to milk?

PROF. PUTNEY: Yes, I think it would be; but it is a question for the individual.

The CHAIRMAN: The experiment at the I. C. S. has proven that exercise does not cut any figure if you let them out every day, but so far as the calves are concerned, they will do better if raised in the fresh air. One cow there has a record of 38,000 lbs. of milk and 2,200 lbs. of butter, and she stood on a cement floor, too, and not on a cork pavement. I don't believe, though, that I could keep a cow so closely out of doors. I would have to be converted. I have been in the dairy business for thirty years, and I have milked the cows outside, but I prefer not to do it. I agree with the Professor that it is largely a matter of the individual.

A Member: What kind of a coat of hair have they, to stay outside in our winters up here?

The CHAIRMAN: Oh, about as long as your hair; but don't think you can begin to turn a cow out in December. You must begin when they are calves.

PROF. PUTNEY: Perhaps I was not clear in my statement. Last winter a year ago we turned a number of cows out naked; they were not prepared, and for several weeks they did not do well, but after that they stood it all right in the most severe weather. Dr. Conard, I think, will bear me out on this, and so will Dr. Haviland.

A Member: Is it not a fact, however, that some of those sheds at State College are better than some of the barns I have seen, and better protected? The sun could strike way back, and they were well protected. You take the ordinary Swiss barn, where the sun cannot get in except for a little while, and where the windows are open, the cattle are in a draft all the time. I know when I was a boy, we had a stack of straw out in the pasture, and in bad weather we would find the cattle all huddled up against it for protection.

The CHAIRMAN: Dr. Thorne is now ready to address the joint meeting upstairs, so we will have to cut short this discussion, interesting as it is, and go up to hear him.

Don't forget the meat demonstration by Prof. Tomhave this evening.

Adjourned until 7:30 P. M.

Thursday, January 28, 1915, 9.30 A. M.

Mr. Bailey in the Chair.

You will please come to order. We have with us this morning, the Secretary of the National Dairy Union, who has a message for us. We will listen to him first.

Mr. Creasy spoke as follows:

ADDRESS OF MR. CREASY

Mr. Chairman and Gentlemen: I am very much pleased to appear before the State Dairy Union. As your President has said, I have been elected Secretary of the National Dairy Union.

I have a letter here from the National President, who is down in Memphis, Tenn., in which he says that the oleo people in that state are willing to give us anything we wish, if they are only allowed to put color into their oleo, in order to get the restaurant and hotel trade. We have fought them here, and they cannot use it so far, but in the South they use a cottonseed oil, and they are very strong because they are backed by the Standard Oil Company. Now they are willing to spend money to win their fight, and are going to get or try to get a bill through Congress, allowing them to color their product. It will be necessary for those of us who are interested in creameries to fight this. The creamery men do not feel that it is a fair proposition, because if they are allowed to put color into their product it will only be a few years before they will obtain the same price for their product that we get for good butter.

He said that it would mean a boom in the beef business, and I suppose there is something in this, but I believe that by our law prohibiting the use of color in oleo we have kept the butter in this State from coming into competition with oleo. Of course, not all states have the same law. St. Louis has it.

Now you people all know what Elgin Creamery Butter is, but the oleo people are putting on the market an oleo labeled "Elgin Creamery;" and there is another brand "Fancy Fox River Creamery." Now, this does not say "butter," but where color is allowed, most of you would say it was butter; you would think so, but it only says "Fancy Fox River," and it is oleo; and with a national law permitting the use of color, it would give us a great deal more trouble than we have now. Now, the National Dairy Union proposes to go before Congress, not in the present short session, but at the regular session, and fight the effort of the Southern people to get a law of this sort. In Denmark, where they can not produce enough butter, and where probably more oleo is eaten by the people than anywhere else, they always know what they are eating, and it has been our principle always for every tub to stand on its own bottom.

Now you creamery people know that if you get above a certain per cent. of moisture in your butter, you are liable to a fine, but the oleo people can go to 40% if they want to. There is nothing to prohibit them.

Another thing is that they mix butter with oleo. We are not allowed to mix oleo with butter. The present administration at Washington, the present Secretary of the Treasury, is more friendly to us than the last administration. Mr. MacVeagh, who was Secretary of the Treasury under the last administration, was a Chicago man, and he put the decision against us. I wish you people here would put your position in such shape that it can easily be reached. I suppose you are all in favor of protecting the butter makers, except possibly a few men from Brother Bayard's Pittsburg end. I wish you would fix things up, because it is coming off before another meeting of the Dairy Union.

I thank you for your attention, and any questions I can answer, I am very willing to do so.

The PRESIDENT: Any points you would like to ask Mr. Creasy about? There are some very good things to think about—the moisture in the butter, and the mixing of oleo and butter, for instance.

MR. BAYARD: I think it would be Bailey's Congressional district rather than mine that might be in doubt.

MR. CREASY: You are all tarred with the same stick.

The PRESIDENT: Any further questions? It will be well to bring them out now.

MR. BAYARD: What proposition do the Southern people make?

MR. CREASY: Anything we ask, except that they want the color.

MR. BAYARD: Don't they want to label the packages and sell it in the original package?

MR. CREASY: Oh, anything you want, but after the oleo leaves the carton or package, you cannot tell whether it is oleo or butter, if it has the color in it. If it is colored, you cannot tell it from butter except that it sells from four to five cents lower.

MR. BAYARD: My experience has been that it sells for the same price so long as it has the color.

MR. CREASY: One of the largest manufacturers said on the stand at Washington that there is more money in colored oleo than there is in uncolored oleo.

The PRESIDENT: Any further questions? If not, we will take up the next subject, a talk on "Principles in Plant Breeding," by Prof. C. E. Myers of State College.

Prof. Myers spoke as follows:

PRINCIPLES AND PRACTICE OF PLANT BREEDING

By PROF. C. E. MYERS, *State College, Pa.*

(This address was delivered with lantern slides.)

Every organism is the result of two forces, environment and heredity. By environment is meant that which has to do with immediate surrounding of the individual as soil, air and water, and by heredity is meant those factors which determine the specific nature of the individual in question.

Each of the factors mentioned are of primary importance to the complete development of every individual. They are interdependent, and the highest degree of perfection is seldom reached unless they work in harmony.

In the past most of our efforts have been directed to the improvement of plants and animals by changing and improving their environment, and the work has not been done without a considerable degree of success. However, improvements which arise because of superior environment are of short duration, and are usually accompanied by considerable expense, while improvements due to heredity, though possibly expensive, are usually more or less permanent. Thus we may increase the yield of our corn or wheat crop several bushels per acre by the application of a fertilizer rich in available plant food but the result will be for the year only, while if the increased yield be due to a superior strain of seed which produces a larger crop because of heredity, the high yielding character will be transmitted from one crop to another through succeeding years.

It is probable that more systematic attention has been devoted to the improvement of plants since the year nineteen hundred than was done in all the previous history of the world. Doubtless the greatest impetus to the work was the rediscovery of Mendel's law of which we shall speak in more detail later. Much interest has been aroused in the subject of plant breeding through the work of Luther Burbank, until at the present time his name is a common household word. The work of Burbank has served to bring the subject before the general public. Unfortunately, however, due to the efforts of over zealous journalists, many persons have been led to consider his work as magic, or else that he was running opposition to the Creator, and that his "creations" were of economic importance to an extent scarcely within the bounds of the most fertile imagination. As a matter of fact it is nothing of the kind. Practically all of the results obtained by Burbank or others, when carefully scrutinized, are relatively simply and conform quite closely to well known principles. Much of the success of Burbank is due to the fact that he works with immense numbers. It is possible that some of you have heard of some of the beautiful varieties of lilies he has developed, but doubtless you have not heard that of half a million plants only fifty were retained for further propagation, the others being destroyed. Likewise many of the positive

results in plant breeding, about which the public hears so much, have been obtained only after an immense amount of painstaking work about which the public hears nothing. The practice of reporting only one side of the story has led many persons to become interested in plant breeding, later to give up in disgust, when they found that their efforts were not crowned with immediate success.

Variation is an inherent fact of all organisms. No two individuals are exactly alike. Thus the passerby looking at a field of wheat may say that the plants are all alike, but the careful observer will find that while in most instances there is a general resemblance between the plants, yet no two are exactly alike, and at infrequent intervals a plant may be found which is distinctly different from any of its neighbors. We thus have two kinds of variation, *continuous,* that in which they occur but rarely such as would be illustrated by the distinctive wheat plant. By some this last type of variation is designated as *sports* or *mutations.* The fact that variations occur makes improvement possible, however, the manner and extent to which they occur is of fundamental interest to the plant breeder, and to a large degree is dependent on the method of reproduction.

All plants are reproduced by one of two methods. In one, the *sexual method,* the plant goes through the seed stage previous to which the flower or blossom performs an important function. It is this type of reproduction which is most common in the general farm and garden crops with the exception of potatoes. In the *asexual method* of reproduction, the characters are transmitted from one individual and generation to another by parts separated from the parent plant as in the case of grafting fruit trees or in potatoes when tubers are used.

The plants which are reproduced by the sexual method are further subdivided into those which are self-fertilized and cross fertilized. In the first class the same blossom contains the essential male and female organs, and are so constructed that fertilization with foreign pollen is almost or entirely impossible as is the case of the wheat plant. In the second class the plant bears two kinds of blossoms, male and female as in the case of the squash or the respective blossoms as regards sex are born on separate plants, as may be observed with respect to asparagus. Again the plant blossoms may contain both the male and the female organs but the construction is such that fertilization with other blossoms is essential to seed development as is the case with cabbage. Wherever foreign pollen is essential to the development of seed the plant is said to be cross fertilized, of which the examples cited are typical. It will readily be appreciated that variation will be much greater in individuals which are reproduced sexually than those which are reproduced asexually. This may be illustrated by the Baldwin apple which was found as a chance seedling in Eastern Massachusetts in 1742, and which has since been propagated by budding and grafting until the number of Baldwin trees doubtless runs into the millions, yet the general Baldwin characters are present whether the tree be grown near its ancestral home or hundred of miles away. It is true that there will be some slight variation due to local environmental conditions, but in general the Baldwin characteristics predominate. Likewise in the case of plants which are self-fertilized as wheat, the variation is re-

latively slight, and once having selected a superior strain or plant which is superior because of heredity, no further attention need be given to maintaining its purity. On the other hand, plants which are cross fertilized as corn or cabbage produce marked variations in succeeding generations because of the mixture of other plants each of which has a different parentage.

With the foregoing facts in mind it is evident that when undertaking the improvement of any crop one of the first points to receive consideration is that of the nature by which variation arise, and the extent to which they may be utilized to secure the end desired. Obviously plants which are reproduced asexually are less variable than are those in which the sexual method is involved. Therefore, once having discovered a promising variation, it may be rapidly multiplied in many instances by division of the parent plant as was the case with the Baldwin apple, the Concord grape and the Seckel pear, each of which originated as a sport or mutation and were later propagated. The same may be said with respect to the Gano and the Northern Spy which was discovered as a chance seedling more than one hundred years ago. Also the Roxbury russet and Jonathan, each of which have added material to the apple industry of the country. Sometimes a branch of a tree differs materially from the general type of the parent tree and thus arises a new variety as is said to have been the case with respect to the Gano, Black Ben Davis, each of which are said to have originated as bud sports from the well known Ben Davis. Also the Red Gravenstine originated as a bud sport from the regular Gravenstine.

Plants which are self-fertilized are quite satisfactory material with which to work in the attempt to produce improved varieties or strains. By isolating and propagating the chance varieties, commonly called sports or mutations, new or improved sorts may be developed. It is this method of plant improvement which has given to the world the Fultz wheat. This variety was first discovered as a plant possessing striking pecularities in a field of Lancaster red by Abram Fultz of Mifflin county, Pennsylvania, in 1862. The plant was saved and from these selected heads was developed the Fultz which at one time was quite popular. The same method was involved in the development of the variety Gold Coin, which was found as a sort in a field of Hybrid Mediterranean by Ira W. Green of New York, who by five years of selection and propagation increased the yield about ten percent.

In the field of the vegetable gardener considerable improvement has been made by the selection and propagation of chance sports. It is said that many of the varieties of tomatoes originated by the Livingston Seed Company were found as variations in their fields of well known varieties which were being grown for seed. Likewise the variety Enormous was found as a variation in a field of Stone by Mr. Meese of Lancaster, Ohio. Again the Earliana is the result of competition on the part of truckers living in the vicinity of Sweedsboro, New Jersey, who tried to excel each other in getting on the market with the first early fruits. At State College we have made some progress along this line of selecting for earliness and yield, at the same time taking into consideration the general character of the fruit. The result of this work with Earliana is shown in the fol-

lowing table. It will be seen that with respect to both earliness and productiveness we have made considerable improvement when compared with the commercial seed used as a check, and which, in this case, was the best obtainable as was shown by our previous strain tests.

TABLE 1.

AVERAGE TEST OF EARLIANA

Record Number.	Average weight of fruit.	Yield per acre to Sept. 2.	Yield per acre to Sept. 12.	Corrected yield per acre.	Per cent. marketable.
	lb.	T.	T.	T.	
Check[2],	.28	9.73	11.04	11.43	83
Check,	.18	9.03	13.03	15.75	88
1-[3],	.25	12.09[2]	13.49	14.55	88
1-12[2],	.21	11.17	13.71	14.37	93
1-12-12,	.16	9.02	13.32	15.23	90
3-,	.22[3]	12.94[2]	15.03	16.75	87
3-18,	.20[2]	11.75	15.48	16.21	91
3-18-26,	.17	7.83	12.83	16.87	95
3,	.20	7.37	11.66	15.25	95
4-,	.27[2]	12.65	11.99	12.93	86
4-15,	.21[2]	9.63	11.72	14.40	92
4-15-7,	.20	8.78	12.24	14.60	96
40a-,	.24[3]	8.91[2]	9.92	11.89	85
40a-15,	.22[2]	9.22	12.11	14.21	89
40a-15-4,	.19	7.68	11.88	13.65	97

The Department of Agronomy has been conducting some experiments with wheat with respect to selection to improve the strain as may be seen by the next table.

TABLE 2.

COMPARISON OF PARENT VARIETIES OF WHEAT WITH BEST SELECTION.

	Av. Yield 1913-14.
Reliable,	33.1 Bu.
Reliable selection 19-09 b,	37.6 "
Reliable selection 38-09,	38.8 "
Dawson's Golden Chaff,	37.1 "
D. G. C. selection 25-08,	44.0 "
D. G. C. selection 120-09,	45.5 "
Fulcaster,	30.1 "
Fulcaster selection 44-09,	40.2 "
Fulcaster selection 50-09,	36.5 "
Fulcaster selection 63-09,	35.8 "

From the above table it will be seen that the selection of Fulcaster has given an increase over the parent of nineteen percent., while the other selections have yielded slightly less.

Potatoes are a desirable crop with which to engage in plant improvement. The method usually employed is generally known as Tuber Unit. In it the tubers are cut in four pieces as nearly uniform as possible and planted one piece to a hill, each four hills being

designated as a unit. At harvesting time the yield of the respective four hills are thrown together and the result compared with that of other units. In an experiment of this kind now in progress of the Department of Agronomy, there has been an average increase of 45 per cent. for the best five selections grown the past season, as may be seen from the following table:

TABLE 3.

GAIN FROM TUBER SELECTIONS OF POTATOES. TWENTY SELECTIONS FROM TWO HUNDRED SEVENTY-FOUR SELECTED TUBERS IN 1912.

	1913 Ten hill plats.	1914 Rows sixty-two feet.
Yield of parent variety,	10.3 lbs.	91.8 Bu. per A.
Av. yield of selections,	14.5 lbs.	118.7 Bu. per A.
Average gain,	42.0 %	27.0 %
Highest gain,	103.4 %	47.4 %
Av. gain of the best five in 1914,	60.2 %	44.3 %

Plants which are cross fertilized are usually quite difficult material with which to work. From the fact that two individuals are concerned in fertilization and seed formation, and that the same has been the case indefinitely, it is easy to see that the individual plant is really a collection of the characteristics of many plants to a greater or less degree. The difficulty of controlling pollination is not a small one, and this having been accomplished frequently with pollen of the kind desired, and in case fertilization does take place the plant may or may not show the desired combinations. It is tru that in some cases of cross breeding, we get a blending of the characters of the respective parents, while in others only one parent shows its influence on the progeny.

It was not until 1900 that anything definite was generally known concerning the method by which certain characters are inherited. At that time the work of Gregor Mendel, an Agustinian monk, was rediscovered. He did his work with peas and reported it to a society in 1865, but it attracted little or no attention at the time and was almost forgotten until 1900 when it was rediscovered. Mendel, as a result of his careful work, which extended over a period of eight years, show how peas possessing certain distinct characteristics when crossed will produce in their progeny certain characters with mathematical accuracy. His work has done much to place the science of breeding on a firm basis, as well as to stimulate interest in the subject so that today we have Mendelian characters and ratios for both the animal and every gradation from snails and mice to man, including both the animal and the vegetable kingdoms. The work is facinating and its results will ultimately be of inestimable value since to a large extent it makes possible the conducting of breeding work with a considerable degree of mathematical certainty.

Another fertile field of plant breeding is that of breeding for disease resistance. For example, it is estimated that the leaf blight of the potato diminishes the value of the crop more than $36,000,000

annually. Associated with this is the indirect expense due to preventive measures as for machines, fungicides and labor. Again it not infrequently happens that the disease reaches proportions such that it becomes necessary to abandon the industry as was the case with respect to the rust on asparagus. It was introduced into this country in 1896 and in a few years had spread from the Atlantic to the Pacific, in many localities completely destroying the industry. Sprays of various kinds were tried but without positive effect and many growers gave up in despair. A few growers, more observant than their neighbors, noticed that sometimes a plant would be found in the infected field free from the disease. These were later isolated and through the co-operation of the Bureau of Plant Industry of the Department of Agriculture, have been used as the basis of developing resistant strains. This work has been effective to an extent almost beyond the expectations of the most optimistic.

The history of the grape industry here and abroad is rich in inspiration for the plant breeder. Early settlers attempted to introduce European varieties but almost invariably they were overcome by either the phylloxera, which attacked the roots or the mildew on the leaves. The native varieties had become immune to these parasites but they were generally undesirable from the standpoint of the horticulturist. In some way, however, these pests were introduced into France and threatened to destroy the wine growing industry because of the ready succeptibility of the European varieties, and it was not until someone discovered the possibility of grafting the European varieties on American roots that the injury due to the phylloxera was overcome. It was also found practicable to hybridize with the resistant American varieties and thus successfully combat the downy mildew. Thus was the grape growing industry in both Europe and America first placed on a firm basis.

Within recent years the truckers of Wisconsin have suffered great loss from the attacks of a disease known as the "yellows" on their cabbage. Spraying is impracticable, but with the aid of the scientists of the Agricultural Experiment Station they have succeeded in developing an immune strain. Sometimes plants are found which are resistant to disease but are not desirable from other standpoints, but they may be used for hybridizing and their disease resistant properties transmitted to the progeny where it is sometimes possible to combine it with other desirable characters. This was done by Biffen, an English plant breeder when working on rust resistant wheat. At State College, we have in progress an experiment with cabbage in which we are attempting to produce a disease resistant strain of Danish Ballhead by combining it with a rather inferior variety but which is resistant to disease.

In conclusion, we may say that plant breeding will not have reached its fullest development until the general farmer and gardener, as well as the scientist, becomes interested in the work. In the past much of the work of economic value which has been done has been by persons other than professional scientists. Riley, the Indiana farmer, who bred the Boone county White corn, was an ordinary farmer and not a scientific experimenter, yet the one variety he developed is today being grown extensively over a dozen corn states and has added thousands and thousands of dollars to the corn crop of the world.

Much has been said and written concerning the tendency of boys and girls to leave the farm. Let them become interested in plant improvement, the boys in field and orchard crops and the girls in vegetables and flowers and the difficulty will largely be overcome. At the present time probably no field of human activity offers greater opportunity for interesting work and reward than does the field of plant breeding. The surface has scarcely been skimmed, and when pursued with intelligence and energy, success is almost sure to follow.

The PRESIDENT: Discussion of this subject will be left until this afternoon. We have with us now Dr. Thorne, of the Ohio Experiment Station, a man who is doing, and has done for many years, a great work in the matter of Fertility. Gentlemen, this is Dr. Thorne, of the Ohio Experiment Station.

Dr. Thorne spoke as follows:

LIVESTOCK AND SOIL FERTILITY

BY DR. C. E. THORNE, *Ohio Experiment Station, Wooster, Ohio.*

Gentlemen: In what I said yesterday—I talked a good while—I meant to call attention to the experiment at your State College which takes rank as the earliest, most thorough and complete experiment in fertility in the world. Started thirty-three years ago, on a very comprehensive plan, it has continued from that day to this without interruption, its only object the study of the use of fertilizer, it has passed comprehension in value. That the results obtained there, in many cases, differ from those obtained elsewhere, is not at all a matter derogatory to the experiment, but, on the contrary, they are finding in this work that no two soils give exactly the same result; and they are finding, also, that it is necessary to conduct these experiments very carefully, and then compare the outline of an experiment on one type of soil, with the experiment on another type of soil.

I was very much interested this morning in a paper I heard upstairs—I was up there the early part of the morning—on the varieties of Pennsylvania soil. That paper was of the utmost value to the Pennsylvania farmer, because you have a larger variety of soils, and more different kinds of rock, and farm under different conditions of rainfall and temperature, such as exists probably nowhere else in the world and have a question of fertility and soil maintenance to work out, such as exists probably nowhere else in the world.

Lime—There was a good deal said about it in the past. These experiments at your State College were conducted upon a limestone soil, as it was at that day. The experiments were conducted at a time when the whole work of field experiments was still in its infancy, and they had to go it blindly. They were in a state where it was customary to use large quantities of lime—very large quantities,

as compared with what is recommended today; and their experiments were of untold value in showing the foolishness of using too much lime. Now, where they applied one ton of lime every two years in a four years rotation two tons of lime every four years—and no other fertilizer, the result was that this large application of lime on a limestone soil brought about a decrease rather than an increase. Just that same thing would be likely to happen to an ordinary farmer, and he would not know why his crops were falling off. On the other hand, where two tons of ground, raw limestone have been used alternately with six tons of barnyard manure, there has been a marked increase over the use of the manure alone. One thing that was learned as the result of that experiment is that it is necessary to use lime in connection with other fertilizer. Lime cannot be used alone if we wish to keep up the fertility of our farms.

You cannot be proud enough of this work, supplemented, as it is, by other similar work in your State.

Unless I limit myself by a manuscript, I am apt to talk too long, so with your permission, I will read what I have to say, at least in part, supplementing it from time to time as I go along, with what occur to me as being of interest to the subject before us.

"When Nature is left to itself, the soil does not lose, but gains in fertility." The annual growth of vegetation falls upon the land, covering the growths of previous years, which are gradually incorporated with the soil through the processes of decay and the action of worms, ants, and other burrowing insects and animals, each year's growth adding to the total stock of available plant food a little fresh material, which has been wrested from the rocky particles in the soil by solution in water, and by the work of micro-organisms and other agencies to which we apply the term "weathering:" so that each succeeding springtime finds the soil of the wild forest or prairie a little more fertile than the one before.

It would seem that if the land were pastured, or if all its produce were fed to the livestock and the manure returned, a similar increase in fertility should take place, and many farmers practice the keeping of livestock with this end in view; but a little consideration will show that there may be losses of fertility from the stock farm closely approaching those of the farm from which all produce is sold.

The growing animal is constantly building a skeleton, which serves as a framework to support its vital organs. This skeleton is composed chiefly of two elementary substances, both obtained from the soil, namely: phosphorus and calcium, united with each other in the combination known as phosphate of lime.

Where animals are grown upon pasture, therefore, and then sent to market, there is a steady drain from the soil of these two elements. The losses of nitrogen and potassium will be relatively smaller, because there is constantly some restoration of nitrogen from the small amount of combined nitrogen annually brought down in rain, and from the much larger mount which may be secured by the nitrogen—fixing organisms in the soil, while the amount of potassium carried away is extremely small, and is usually compensated by the weathering of the large supply of this element found in most soils.

If animals are pastured for milk production instead of for growth, the draft upon the bone-building elements is still greater, as is easily understood when we watch the rapid growth of a suckling calf, and a good dairy cow will produce enough milk in a year to raise two or three calves.

It is during the winter months that the great losses in fertility occur in livestock husbandry; for then not only are the phosphorus and calcium of the feed drawn upon for skeleton-building or milk production, but unless the manure is very carefully saved there will be large losses of nitrogen and potassium also.

Thinking farmers have long realized that these losses must be considerable, and several experiment stations have studied the question. At the Ohio station we have endeavored to learn how much of the fertilizing elements contained in the feed it is possible to recover in the manure, and what the losses in this manure are under different systems of handling. When cattle were fed on cemented floors, we were able to recover in the manure three-fourths of the nitrogen and eighty to ninety per cent. of the phosphorus and potassium contained in the feed and bedding, but on earth floor, though fed under cover, the losses during six months feeding were sufficient to have paid half the cost of cementing the floor.

When manure from fattening steers has been exposed for three months in an open yard, in piles ten inches deep, it has lost forty-four per cent. of its potassium, thirty-two per cent. of its nitrogen, and fourteen per cent. of its phosphorus; the loss of phosphorus being lighter because the element is chiefly voided in the undigested residue carried in the solid excreta, whereas the nitrogen and potassium are chiefly found in the liquid excreta. Being already in liquid condition these elements are more readily carried out by leaching than the phosphorous.

In planning the soil fertility experiments at the Ohio Experiment Station, the ordinary farm practice of twenty-five years ago was taken as the standard. At that time it was a common practice among the more careful farmers to grow the cereal crops in a more or less systematic rotation of corn, oats and wheat, followed by clover and timothy mixed, the grass crops being allowed to stand only two years by the better farmers, though many would sow the timothy a year or two and then pasture it for one or more seasons.

It was customary to stack the straw in open barnyards and feed the livestock of the farm around these straw stacks through the winter, throwing into the yard the manure from such stock as was stabled. Usually the barnyards were not cleaned out until after harvest, partly because of the rush of work to get the crops planted in the spring, and partly in order to let the cornstalks and straw become more thoroughly rotted, so as to make the manure easier to handle. There was a very prevalent opinion that the well rotted manure was most effective, and that it would waste if exposed to the sun, and many farmers, in emptying their barnyards, piled the manure in small heaps over the field, to be spread ahead of the plow. Some, however, had discovered that manure loses only water in drying, and that a top dressing of manure, after the land had been plowed of wheat, was not only particularly good for the wheat, but

also for the clover and timothy following. There may have been a few farmers who practised hauling the manure directly from the stables to the field and spreading it at once, but their number was exceedingly small.

In planning these experiments, therefore, no provision was made for the use of fresh manure, but it was taken from the barnyard and applied to both corn and wheat in a five year rotation of corn, oats and wheat, one year each, followed by clover and timothy two years. The manure was plowed under for the corn crop, because of the interference of trashy manure with the cultivation, but was applied as a top dressing to wheat. Two quantities of manure were used, eight tons per acre for each crop, on one series of five plots, and four tons on each crop for another.

Alongside of these plots were others receiving different quantities and combinations of chemical fertilizers, and it soon became apparent that the fertilizers were running away from the manure, even when they carried much smaller quantities of the necessary elements of fertility. For example, Plot 18, was getting eight tons of yard manure on corn and wheat, or sixteen tons for each rotation, estimated to carry 150 pounds of nitrogen, 32 pounds of phosphorus, and 112 pounds of potassium, while plot 14, which was fertilized on corn and wheat only, was receiving only one-fourth this quantity of nitrogen, half as much phosphorous, and two-thirds as much potassium, and yet at the end of the first five-year rotation, the total increase on Plot 14 had been greater than that on the manured plot.

This outcome was altogether contrary to our expectations, for we shared in the common opinion that the chemical elements in manure should be as effective, pound for pound, as those in fertilizers, and that manure should possess a further advantage in its physical effect upon the soil.

We therefore undertook a more thorough study of manure, by starting a series of experiments in which manure taken directly from the stable to the field and spread at once is compared with the manure which is thrown into the barnyard and allowed to lie there for several months before it goes to the field. This work has been continued for eighteen years, and the outcome has been that the manure which has gone directly from the stable to the field has produced increase greater by twenty per cent. as an average of five duplicate comparisons, than that which passed through the barnyard.

These field experiments have, therefore, fully confirmed the chemists verdict respecting the loss which manure suffers through exposure to the weather; one chemical analysis having shown a loss of fourteen per cent. of the phosphorus, with still larger losses of nitrogen and potassium during the short period when the manure was exposed.

That the losses are very much greater when the manure lies in the barnyard until August, instead of only until April, cannot be doubted. But the loss which manure suffers from exposure to the weather is only part of the loss which is experienced under the ordinary farm practice. Attention has already been called to the relatively large draft upon the soil phosphorous in the growth of young animals and the production of milk. In grain farming there is a

similar loss of this element; for as the plant matures about three-fourths of its phosphorus is traneferred to the grain and whether the grain is sold or is fed, this phosphorus, or a considerable part of it, is carried off the farm. The result is that a relative deficiency of phosphorus is soon shown in the soil, and if enough manure is used to make up this deficiency, there will be a considerable waste of nitrogen and potash.

For these reasons the experiments in which fresh manure and yard manure were contrasted were so planned as to show the effect of reinforcing the manure with phosphorus, by mixing it with acid phosphate, or with the crude phosphate rock from which acid phosphate is made, these materials being added at the rate of forty pounds per ton of manure, the crude rock being ground into the fine powder called floats.

THE REINFORCEMENT OF MANURE

Manure and Treatment.	Increase per acre.			Net value of increase.	
	Corn, bus.	Wheat, bus.	Hay, lbs.	Per acre.	Per ton of manure.
Yard, untreated,	19.8	9.5	890	$23 85	$2 98
Fresh, untreated,	24.0	10.8	1,470	30 15	3 77
Yard, and floats,	25.2	12.5	1,637	31 78	3 97
Fresh and floats,	31.5	14.7	2,396	40 93	5 11
Yard and acid phosphate,	31.4	15.3	1,904	38 67	4 83
Fresh and acid phosphate,	35.1	16.1	2,583	44 26	5 53
Average unmanured yield,	34.3	11.5	2,717	....	....

Valuation: corn, 50c per bu.; wheat, 80c per bu.; hay, $10 per ton.

The manure is applied at the rate of eight tons per acre to corn, in a three year rotation of corn, wheat and clover, each crop being grown every season, and the table shows the outcome of eighteen years work. In computing the net value of the increase the cost of treatment is deducted, on the basis of the cost of the materials in bulk carloads, which would be about $7.50 per ton for floats and $11.50 for acid phosphate, or about 15 cents per ton for manure for floats and 23 cents for acid phosphate. No allowance is made for the extra labor of handing the larger crops produced by the treatment, nor for the additional value of the straw and stover.

When the experiment was begun, it was expected that the floats, while it might be slower in action at first, would eventually produce the larger effect, because a ton of floats carries about twice as much total phosphorus as a ton of acid phosphate, but this expectation has not been realized. On the contrary, the acid phosphate is gaining relatively on the floats, as shown by the comparison below of the value of the produce of a ton of manure in these experiments for the first three rotations, or nine years, compared with the value of the nine years following:

Manure and Treatment.	Value of increase per ton of manure.		Gain for second period.
	First period.	Second period.	
Yard, untreated,	$2 34	$3 70	$1 36
Fresh, untreated,	3 17	5 07	1 90
Yard and floats,	3 70	4 35	0 65
Fresh and floats,	4 82	5 40	0 58
Yard and acid phosphate,	4 20	5 66	1 46
Fresh and acid phosphate,	5 07	5 97	0 97

The table shows that under all the treatments the manure has produced a greater effect during the second period than during the first. This has been partly due to the use of lime during the second period, but aside from this, there has been a steady increase in the effectiveness of the manure from the earlier years of the test, such season's results, as a rule, having raised the average for the entire period of the experiment.

As between the two carriers of phosphorus the superiority of the acid phosphate over the floats has been greater during the second period than during the first.

It will be observed that the untreated manure has made a greater relative gain than either of the phosphated manures, though still far behind them. This fact, and the gain of the acid phosphate over the floats, may possibly be due to an increasing demand for nitrogen in the soil. In untreated manure, nitrogen is found in considerable excess over phosphorus, and the treatment with acid phosphate has a tendency to conserve the nitrogen.

Acid phosphate is made by mixing sulphuric acid with the raw phosphate rock. When mixed with manure, and the heap begins to heat, with evolution of ammonia, there may be a decomposition of the phosphate resulting in the formation of sulphate or phosphate of ammonia.

Our experiments have shown that a ton of manure, reinforced during accumulation with phosphorus, and taken directly from the stable to the field, may produce increase in ordinary farm crops to the value of five dollars and more, over and above the cost of its treatment. It would not be fair, however, to say that the ton of manure is worth five dollars, for parallel experiments have shown that one dollar judiciously expended in chemical fertilizers may produce an increase in the same crops to the value of two dollars, and that there may be an increasing effectiveness following the use of such fertilizers very closely approximating that observed in the use of the manure. Hence we conclude that the value which should be placed upon manure in comparison with fertilizers, should be about two dollars and a half per ton, which would be approximately

the value of fresh cattle manure with bedding, if we rate it nitrogen, phosphorus and potassium at the price at which they may be purchased in such fertilizing materials as tankage, acid phosphate, or steamed bonemeal and muriate of potash.

The feeding experiments of the Ohio station have shown that in feeding cattle on cemented floors we may expect to recover about sixty pounds of manure and bedding per day for one thousand pounds live weight, or about two pounds for each pound of air dry substance in the feed. This would amount to about five tons of manure for six months' feeding.

In our experiments in the use of manure, we have obtained an eighteen year average of 67 bushels of corn, 27 of wheat, and 2½ tons of clover hay from an application of eight tons of phosphated fresh manure to the corn crop, the whole amounting to nearly eight and a half tons, including the stover and straw, and the yield is steadily increasing. This is being done on land that, when left continuously unmanured, has produced by 36 bushels of corn, 11½ bushels of wheat and 2740 pounds of hay.

It would seem, therefore, to be easily possible to organize a system of farm management which would maintain a high state of productiveness for a long time without the purchase of any artificial fertilizer except some carrier of phosphorus.

Over in England they experimented for twenty years with manure, and at the end of thirty years they were still receiving benefits which they could not have received from unmanured land. Manure is much more profitable than chemical fertilizer, as they demonstrate it over there.

I might mention, also, that we have been able to find no danger to animals by the use of acid phosphate.

MR. PALMER: Use it with sheep?

DR. THORNE: I think not. I am not positive, but I think we have not. The acid phosphate would seep down through the litter, if the manure left in the yard were treated with acid phosphate, so that it would not strike the feet of the herd. Even in the case of sheep, it would be only an ounce or two of it. Our advice is, acid phosphate for the man who buys his fertilizer in small amounts, while floats can be bought by the carload only; but today, after eighteen years, we do not find much advantage in the use of floats. In fact, I would advise the use of acid phosphate everywhere except in the open barnyard; there I would advise the use of floats.

A Member: Grow any organic matter?

DR. THORNE: I would give exactly the same answer to that. In our field work we have used floats on a poor soil as a direct application to the land, and alongside of it we used acid phosphate and got a very much better result from the use of the acid phosphate. We have used floats in the same proportion and of one ton per acre, on land that is thin and heavy and deficient in organic matter. Part of this land has been heavily manured, and it has paid us to use the one ton per acre every five years. Our expenditure of eight dollars per ton every five years has repaid us many fold, but I firmly

believe that acid phosphate would have paid better. Floats pass off readily. The result of our work is that it pays better to use acid phosphate. There are cases where floats may be used to advantage on the farms of Ohio and Pennsylvania, but where the farmer can pay the price for acid phosphate, our advice is to use the acid phosphate. If the farmer can buy in carload lots and wishes to use it in his barnyard, then use floats. Take parts of the Western States, and there are also parts of Ohio where the covered barnyard is unknown; there it would be advisable to use floats; but for the average farmer of Pennsylvania and Ohio it is better to use acid phosphate.

A Member: How much per day per animal?

DR. THORNE: One pound per day per animal; but we believe it would pay us better to use a still larger amount. We have been using manure, eight tons per acre, and acid phosphate, forty pounds to the ton of manure, but we believe it would be well to increase the acid phosphate two pounds, or perhaps not use quite so much manure. So many Ohio farmers tell us they cannot get results from manure, but in those cases, we know they have not balanced it properly with acid phosphate.

A Member: You mean that this is to be used once in a term, and no other fertilizer to be used?

DR. THORNE: Yes; we use a four year rotation; the corn gets ten tons; the wheat gets nothing, and the oats—we get better results on oats by using 400—the 4-16-4 formula. In thirteen crops of corn, we have produced with it an average of 77 bushels more per ten acres; of wheat, 60 bushels; of oats, 10 bushels, and of hay 33¼ tons.

A Member: You say 400—4-16-4?

DR. THORNE: Yes; in Ohio they sometimes use 2-8-2.

A Member: Do you think it would be well to put it on before planting corn, and then plowing it under?

DR. THORNE: No; that will do on clover.

A Member: You think it would be better to put it on clover?

DR. THORNE: Yes; the clover does not need nitrogen, but it does need potash. The clover itself adds nitrogen to the soil; why then put it on? The only reason we turn it in is because we want to get the lime on the surface, and we want to get the trash out of the way, and, in a three years' rotation, when we turn it in, one year, we get manure so thoroughly incorporated in the soil that we don't think we are losing anything by turning it in.

There is another interesting point that has been brought up in this experiment. You will notice that the increase in the land has been so much greater in the last nine years than in the first nine years. We find that if we take the results of our eighteen years' work and compute them the first six years, then seven, eight, nine, ten years, we find that the first time we compute the average increase has been greater in ratio than it was before. That is, it is greater

for seven years than it is for six years, greater for nine years than it is for eight, showing the great accumulation of fertility we are getting into the soil.

A Member: I find with acid phosphate that when my cattle can get it, they lige to lick it. Will that hurt them?

DR. THORNE: Well, I would not let them have much of it because of the sulphuric acid, but it indicates that they need bone material.

A Member: How would you give it to them?

DR. THORNE: I would rather give them floats. We are making experiments now in the line of bone-building material.

A Member I have the ground gypsum rock.

DR. THORNE: Well then use it by all means. We have used gypsum in our experiments, alongside some of the other fertilizers, and we found it would have paid us better to throw gypsum away.

MR. PALMER: Will not gypsum keep the ammonia down better than floats?

DR. THORNE: No; not any better than acid phosphate. That does everything the gypsum does, and more besides.

The PRESIDENT: Mr. Aitken, the President of the Holstein-Friesian Association of America, who was to have addressed us now, is unable to be with us, but has sent a substitute in the person of Mr. Hartshorne, the former President of that Association. I have the pleasure of introducing Mr. Hartshorne, who will now speak to us.

Mr. Hartshorne spoke as follows:

ADDRESS OF MR. HARTSHORNE

Gentlemen: I can probably appreciate your disappointment in not having with you the President of the Holstein-Friesian Association. You will have to listen, instead, to one of the "has-been's"; this world has too many of them; and now you are going to listen to one of them. I cannot give you the talk that Mr. Aitken could: he is a lawyer, and a polished speaker; that is the reason he could not be here. I am merely a farmer—a "cow-man," and at the Holstein meeting yesterday one man had the audacity to tell me that no one would ever have known me if it had not been for the Holstein cow. I do not resent that, because I am such a good friend of the Holstein cow, that I feel rather proud of it. The Holstein cow has permitted me to come down and talk to you today; she has permitted me to preside over the Holstein-Friesian Association. It is not ability to talk or anything else that has permitted me to come before you today; it is because the Holstein cow permitted me to get down beside

her and show that she was an animal worth raising. So, if I cannot talk to you like Mr. Aitken could, I can speak a few words about the Holstein cow and about the pure bred animal. Naturally my talk will lean towards the Holstein cow, because she is my favorite.

Now, what are pure bred animals? They are animals that have been bred all through their ancestors toward a certain type; they have been bred for so long in that way that they have transmitted to a certain degree these characteristics which have been in the mind of the breeder.

I want to say something to you today which will show you the reason for having a pure bred sire. and pure bred cattle.

Now, then, if the animal has been bred for a long time toward a certain type, she will transmit those qualities to her offspring much more easily than a grade, or one not bred to a definite purpose. If we want to make a success in life we must have a definite purpose in view, and if we want to make a success of farming, we must have a definite end in view, and the man who starts breeding animals will not be successful if he does not go about it with a definite end in view. That is the reason why I recommend a pure bred animal. She will do for him the thing he is looking for, and the thing he has planned.

There are two principal things that cattle are bred for; the one for beef, and the other for dairy purposes. Then, again, there are special interests in the dairy business; some of us want to make butter, and others to go to the market with our milk. For the butter, we have the Guernsey and the Jersey, and for producing the milk, we have the Ayrshire and the Holstein; they produce the milk which is the best balanced ration for the human family. The Holstein or Ayrshire milk is not so rich in fat, therefore it is more easily digested, and it contains more of the proteids. and therefore the human family will thrive better on their milk than on the milk of the Jersey. The Jersey paid for my first farm. We had a small Jersey cow. I had some chickens, and the skim milk came in very good for the egg production. I sold my butter and fed my skim milk to the chickens and poults. I have also owned Ayrshires and Guernseys, and while these animals have their place, and do their work, when it comes to selling milk, I made up my mind that the Holstein is the cow for me; and also, when it came to selling her. I had more demand for her in the market. And it is the Holstein cow that has helped to leave the little old back hills, and come down into the beautiful Shenango Valley—one of the richest and most fertile valleys in the State of New York. Therefore I would be ungrateful if I did not stand up for her. She has enabled me to give up riding in the little old-fashioned high covered wagon, and now I can ride in my auto and I can ride behind a good team of horses when I want to use them, and it is all because of the Holstein cow; she has enabled me to get on in the world, and I would be ungrateful if I did not stand up for her.

And what I have done every man can do if he has a little snap and push in him. Some years ago a young man caught a coon on the way to town. He didn't know what to do with it, so he decided to give it to the boy who showed the most intelligence. He asked one of the boys, "What are you. a Democrat or a Republican?" The boy said "I'm a Republican." "Why?" "Because pa and ma are Repub-

licans." "What are you?" he asked the next boy? "I'm a Democrat." "Why are you a Democrat?" "Oh, because pa and ma are Democrats." Then he asked the third boy; and he said "Mister, I'm anything to get that coon."

Now, there is a moral in that little story. If we want to succeed at anything, we must do anything that will help us to succeed at it, if it is work night and day, or anything else, so long as it is honorable and upright. If it means get up before daylight to milk your cow, do it,—anything that will not bring disgrace upon yourself and family.

Then, again, there is another important thing. Don't be anything because pa and ma did it or said it. I know of no man who respects his father and mother more than I do, but when it comes to leaving home, no man will succeed if he does a certain thing just because pa and ma did it. A man must decide for himself, and not be afraid of good, sound, hard work. We want to use our brains with our hands—brains and brawn goes together in making success, and you don't want to depend upon brawn altogether, anymore than you do without it altogether. Drive your business; don't let it drive you. It is the man who drives his business that makes a success of it, whether it be breeding cattle or anything else.

There is another thing that comes in breeding cattle or anything else, and that is right stock. See that you have the right stock. It is just as true of the young man starting out in business as it is of breeding cattle or anything else; you must have the right start—have the right starting point. When a young man gets down it is mighty hard to get the upward start again. It is easy enough to trip and fall down, but hard to get up again. It is the same in breeding cattle. It is easy enough to get the wrong start, but mighty hard to build up again after you have started wrong. I am thankful that I had the right start. I did not have the advantages of the young men of today; I did not go to an agricultural school, but I did read the papers, and came to see where good animals were an advantage. Don't think it is necessary to go out and look for a good record, or pay a high price, but look for a good constitution and good blood. If you don't get a good constitution, you get a wrong start.

A dairy cow is only a machine to consume the roughage on our farms, and turn it into food fit for the human family, and you want a good, strong machine to stand up under the strain for it is a tremendous strain to take this roughage and convert it into food fit for human kind. And at the present price of feed and labor you must have a good, strong machine to make it pay. This was brought home to me in the State of Iowa when I was traveling there. This State is passing rapidly from a beef state to a dairy state, and they are trying to breed dairy animals on a beef strain. The State of Iowa is also a very high-priced state, so far as the price of land is concerned, and I don't see how any young man can succeed there, taking the high-priced farms and trying to do what they are doing there now. Of course, the man who has his land can work it with these animals, but the young man just starting out must have better animals in order to keep his land.

I was told by the Dairy Commissioner that one-third of the animals pay for their keep; one-third do not pay for their keep, and

the other third make a profit. So it is necessary to have better animals, and the people are beginning to realize it more and more.

I know it is getting on towards dinner time, and perhaps I had better not talk much; it is hard for people to listen when they are hungry. I could talk for a long time about the advantages of the Holstein cow; it is the thing for which I came down.

In breeding cattle we are doing something that will influence our children and our grand-children, and what I want to impress on you is that we should stop breeding only for present dollars and cents, and breed something that we can hand down to our children and their children—cattle they need not be ashamed of and we need not be ashamed to pass on. Better not hand down so many dollars. I believe that the man who has these two ends in view will succeed better than the man who has not one of them in view.

In New York State a noted herd was sold not long ago. They were of a fine strain, but it was freely said that the man who bought them would realize his mistake. They brought enormous prices, but they were inbred to such a degree that they had lost their vigor.

A Member: What was the largest price?

MR. HARTSHORNE: Twenty-five thousand dollars for one bull. It was a nice animal. Some people did not consider him so, but it was a nice animal, but his offspring—well, one sold for a hundred dollars and another for forty. He was a nice animal and yet I should have hesitated to pay $25,000 or anything like it for that bull. Why? Because he was inbred to such a degree that his offspring were week-kneed, had no withers and practically worthless. That herd sold for a hundred and forty-nine thousand and some odd dollars, and you will probably see why very few of these animals went to the breeders of the state. They were nearly all bought up by new men in the business. If, however, the man who bought them will take a strong animal and breed to that herd, one not at all related to it, he may re-establish that herd. I have proven this thing in my own work. You want to introduce fresh blood. What do you expect to gain by inbreeding. What do you expect to gain? You say, "if I get good results twice, I can do it the third time." But can you? No animal will stand extensive inbreeding. Even the deer in Scotland began to suffer from this extensive inbreeding, until they introduced moose and infused fresh blood.

A Member: How far would you go?

MR. HARTSHORNE: My idea is to go as far out as you can. If you have a female you like, breed her to a sire that is not related. It may be that your neighbor has a sire whose record is good, if you have not, which you can get. While there is no set rule in this matter, I believe in breeding as far out as possible, but along the same type.

A Member: What is your record for continuing along a line of breeding?

MR. HARTSHORNE: I don't like to blow my own horn but the Holstein has made me. We have just four families of cows, and

three of these have been bred and developed right on my own place. We have what they call a thirty pound cow, making 24,000 lbs.; we have one that has passed the 3,291 lb. mark in butter, and another that has passed 3,150. You may say that this is due to the man behind the cow. This three year old I sold to a sheep man who had made some money in Idaho and was starting a herd here. I have one four year old thirty pound cow which has passed the 3,100 mark, and I had an inexperienced man working on her. The three year old that passed the 3,100 mark is the only one in the world that has that record.

I want to say right here that that is the reason the boys leave the farm. They don't see anything ahead. Leave your boy some pure bred cattle—cows at which he can look and say "that is a better cow than I am a boy," and it will inspire him with enthusiasm to make something of himself. A good cow will inspire the man who milks her.

A Member: After you have gotten up your herd to a pretty high level, do you think you would follow line breeding?

MR. HARTSHORNE: I do. I had one cow, Lillian Walker, who, while she was an excellent producer, never got above 3% butter fat; then I had another cow whose percentage of butter fat ran high, but who had some undesirable points—poor conformation, and an inclination to choke.

Those two thirty pound cows I spoke of went back to Crathill, of old Peter G's stock, who got Lillian Walker; and she proved she had a good connection. These are things you will have to try out; sometimes you have a sire that will prove up all right, and again you have another that will not, but by proper breeding and the process of elimination, you will in time be able to get your herd up.

The PRESIDENT: This has been a very interesting discussion, and we have an exceedingly interesting program for this afternoon, when the Foot and Mouth Disease will be one of the subjects for discussions. Most of you are deeply interested in that, so don't fail to be on hand.

MR. STEVENSON: Mr. Hartshorne has not given us the real reason for quitting the Jersey cow and going over to the Holstein. It was because he could not keep the cat from catching the calves.

The PRESIDENT: The Jersey Breeders will meet this afternoon at two o'clock on the right hand side of the hall, and the Berkshire Breeders at the same hour upstairs. We will now stand adjourned until 1.30 P. M.

Thursday, January 28, 1915, 1:30 P. M.

Mr. Bayard in the Chair.

The PRESIDENT: You fellows out there, come in and get busy; get right down to work. Outsiders, get out or pay your dues and come in with us. We have no time for shirkers here, and we need every dollar we can get.

Before we go ahead with the program we will listen to the report of the Nominating Committee.

MR. NORTON: The Committee has nominated all the old officers for the Breeders' Association, and I move that this report be accepted and the Secretary cast the vote.

This motion was properly seconded and duly carried in the regular way.

The PRESIDENT: We are all unanimously re-elected, anybody anything to say?

How about the Dairy Union? Any report from that?

MR. PERHAM: Something; all the old officers re-elected.

MR. NORTON: I wish to extend an invitation for the International Correspondence School at Scranton to hold our next annual meeting there.

The PRESIDENT: That will come later. Is the committee on Amalgamation ready to report?

MR. NORTON: This Committee consists of Dr. Marshall, Mr. C. J. Tyson, Prof. Larson, Mr. Johnson, Mr. Fielden, and Mr. Weimer in addition to myself. We have decided to let things rest as they are for a while. Dr. Marshall has the report and he has decided to forward it to all the different organization for their consent in writing. The purpose in amalgamating is simply to have one parent organization with the various agricultural organizations simply auxiliary to it, with the privilege of holding their own meetings, and transacting their business as usual; but when we go before the Legislature for an appropriation, we want to show some strength and go there as a united agricultural force. I think that plan is the best, and it was so decided by the Committee; I think it is unanimous, but there was not ime to get it amended and adopted here; in fact, some of the associations did not have the authority to adopt it without bringing it before their bodies. You will hear from it later. It will be presented to the various organizations for their ratification. It does not take away from any of these organizations their individuality or the power to do things their own way. They only become part of the central organization.

PROF. LARSON: On the point of meeting places, Mr. Ziegler, of Reading extends us an invitation to hold our next meeting at that place. They have ample hotel accommodations, and a splendid auditorium where we can hold a show. I should like that to be made a part of the minutes.

The PRESIDENT: Is Dr. Goodman here? He is to speak to us the first thing this afternoon.

PROF. LARSON: He will be here at ten minutes of two.

The PRESIDENT: Then we're ready for a few remarks on the tariff.

MR. NORTON: Good night! We've heard nothing but the tariff the last few years, and haven't done anything or get anywhere for two years now.

The PRESIDENT: We bit. Chase in that Resolutions Committee, some one.

This central organization is one of the most momentous things of the day. It means a State Fair. How about a State Fair. Start it going. Up at Syracuse they have men come all the way from Kansas to be present there, and it is the same everywhere they have a State Fair.

MR. STEVENSON: I had the privilege this morning of going out over the grounds of the Keystone Fair Association, and I was astonished at what I saw. With the proper financial backing there can be no question of its success. I will let a better qualified man, like Mr. Lantz, talk of the financial part, but it is the beginning of what should be done in Pennsylvania. We used to have a State Fair at Scranton some years ago.

The PRESIDENT: Yes, and at Johnstown, too, but they all died a natural and lingering death.

MR. STEVENSON: But there is no reason why this project should do the same; all it needs is for every one of us to do what he can to help it along. With my limited means I am willing to subscribe to it, and I trust every one at this meeting will do the same. Our Holstein-Friesian Association subscribed for one share of the stock, and I don't see why the other Breeders' Associations cannot do the same, as well as each individual breeder. It means the investment of a million and a half in equipment alone, and I doubt whether that will do it. But I want to help the thing along; it is needed badly enough in this State.

MR. LANTZ: Mr. President: I have talked so much about a State Fair—Seventeen years ago the President of this Association sent out a call to the Livestock Breeders of Pennsylvania for a convention to organize an Association of the State Breeders. I guess you all know the President. If you don't, I want to give you some method by which you may know him. He is the very attractive man you see up in the front there, who wears his hair in the style known as the Parisian Bald-headed Bean. This organization is the result of his call, and ever since then he has been talking State Fair. Now, Mr. Bayard don't buy any cheap or poor cattle. He knows what good cattle are; and when he wants to buy a good sire, he goes to the State Fair. Why? Because he knows what you all know, that at the State Fair you will find on exhibition the very best; there is an attractive collection of the finest animals that you or I or any breeder may want to purchase. But why go outside of the State of Pennsylvania to see these animals? You all know why. We have no State Fair in Pennsylvania. That is why Mr. Bayard and you and I and hundred of other breeders go outside of Pennsylvania to a State Fair when they want to buy a good, fine animal. It is not that Pennsylvania does not produce just as fine animals as any other state, but there is no place where they can be brought together for exhibition and selection, and hundred and thousand of good dollars go outside of Pennsylvania every year that might be kept in the State if we had a proper place to exhibit our fine stock.

We all know the need of a State Fair. That has been discussed over and over again. And I think you all know the history back of the Livestock Breeders' Association; it was manufactured to create an interest in a State Fair—to get a Commission appointed by the Legislature to appoint one. We all know by this time that it can't be done, and I don't believe that it is wise to go on forever talking about it; the thing is to go and do something, and get the fair started. That is what we are trying to do, and it is what we are trying to get you people to do.

Now I want to say that the Constitution and By-laws are on a very broad democratic basis. The price of stock has been put at ten dollars a share—a price so low that every citizen of Pennsylvania can afford to buy at least one share, and that will give you a voice in the government of this institution and I belive that the laws governing this state fair will be different from what they would be if governed by a Commission.

We have gone ahead, as most of you know, and bought a site for this State Fair. It is close to three railroads; one route leading from Washington to Buffalo; in other words from Pennsylvania to New York; and it is within a mile of the P. & R. road to New York. We have a population of 18,000,000 within three miles of this location. Indianapolis has 3,000,000 within three hundred miles of her fair, and yet Indianapolis has the only two and a half mile speedway in the country, and has an International Exhibit. And Indianapolis pays over 100% dividends. If Indianapolis with a 3,000,000 population to draw on can pay 100% dividend, why cannot Pennsylvania with a continguous population of 18,000,000, and 2½% more wealth per capita do at least as well.

Now, I would like this Association to show its appreciation of what is being done by subscribing for at least one share of the stock.

MR. STEVENSON: I think Mr. Lantz should make on stipulation —that the President should breed Holstein cattle; everyone knows that the Holstein is the best cow.

I move that the Association endorse the movement to bring about a State Fair, and subscribe for at least one share of stock.

The PRESIDENT: Do you mean one share for the Breeders and one for the Dairy Union, or one for both?

MR. STEVENSON: One for each of them. Each of them ought to be able to afford ten dollars.

The PRESIDENT: I'm afraid they can't. You know we are both in a hole pretty deep, as the result of that show at Pittsburg when the blizzard struck us, and we can't expect much help in the way of appropriations, because the State, as every one knows, is already seventeen million dollars behind. I rather think we will have to make our subscriptions individual.

I was anxious to give Mr. Landis the time he wanted, but I want to say something about the State Fair myself. Pennsylvania needs it, and we will need it. It is the pride of every state that has one. You go to Ohio and say something to any citizen of that state about their state fair, and see what he says, or what he does. There is

nothing that so riles a citizen of any state that has one as to say something derogatory about their state fair. You people can be clear on that point.

So far as I know, the gentlemen who are interested in this project have nothing to conceal. They are all open and square.

I would like to discuss this more at length, but we are to listen to Dr. Goodman.

Gentlemen, this is Dr. Goodman. Now go ahead and ask him some questions.

Mr. Goodman spoke as follows:

CO-OPERATIVE BREEDING AND TESTING

By A. M. GOODMAN, *Dairy Division, Washington, D. C.*

Gentlemen: I am not going to apologize for being here, not even apologize for living, but I want to correct your President. I have no claim to the title "Doctor." I am merely a plain, untitled member of the Department of Agriculture.

The PRESIDENT: He is a United States Department man, and I never saw one yet that did not own up to the title "Doctor" or "Professor" or something.

MR. GOODMAN: I haven't been there long enough, perhaps; but time may remedy that.

I probably know more about farming than about anything else, and when I come before a gathering of farmers I feel that I am among my own people, so I will dispense with the usual formula of being glad to be here, and begin to talk to you, although my talk will probably be without beginning or without end.

The PRESIDENT: Hope it will have an end.

MR. GOODMAN: Well, it has no beginning, then; it will probably come to an end. The first thing, to my mind, is, are we satisfied with our dairy herds? I fear that too many farmers are, and yet on all sides we hear dairymen bitterly complaining that the prices of commercial feeds are exorbitant, and that the price of milk and other dairy products are not high enough to enable a farmer to make a living. I do not deny that feed is high, nor that the price of milk is low, when considered from a standpoint of their food values, yet so long as we expend our time and our energy railing about the prices of feed and milk, we have not advanced very far from the stage where we were crying for the moon. It does not seem to me that any man is justified in finding fault with the conditions under which he is working, until he has done all in his power to help himself, nor do I believe that in going about any improvement one should center his thought on the methods that most closely approach the impossible. In other words, why should we worry about the

price of feed, if we are not studying the economical use of it, and why stew about the price of milk, when we are milking many cows that do not produce enough to pay for the feed they eat.

The returns from the herd may be increased just as much through reducing the cost of production, as through the increase of the selling price. This method of getting increased returns may not be so exciting, but it is much more sure.

Undoubtedly, the first thing to be done is to give attention to better cows, and while we are working on this, to study means of more economical feeding. I am not going to try to tell you where to buy better cows, for I do not know where good cows can be bought, except for very high prices. The original source of dairy cows is not the cow dealers' yards, but the dairy herd. If we want good, productive cows, we must raise them. Breed the best cows we have to the best bulls we can get the use of, and raise the female offspring.

Before we do this, we should be very sure which are the best cows to raise from and what is the difference in value of some of the higher producing cows. The only way to know which are the best cows in the herd is to weigh and keep records of the milk and amounts of feed for each cow. That cow is best which converts most economically the largest amount of feed into milk and butterfat. Most people who have never kept records of their herds believe that they know the best and poorest cows in their herds. however, every day records of the production of herds are showing that even the best dairymen can not tell within fifteen thousand pounds how much milk a cow gives in a year, even when they milk the cow daily.

This may seem ridiculous to some of you; but think of your own cows. Did the cow that stands by the door give 8,500 or 10,000 pounds of milk last year? Did the cow at the other end of the stable give 5,500 or 7,000 pounds? Do you know that 1,500 pounds of milk at $1.80 per cwt. is worth $27.00. How much did it cost you to feed these cows last year? Did it cost you twenty-five, fifty, seventy-five, or a hundred dollars each?

If a man cannot answer these questions, I fail to see how he can claim to know much about his herd.

You may say that weighing and testing is all right, but it takes a lot of extra work, but the men who are doing it will tell you that they spend no time so profitably as that devoted to weighing milk, studying rations and keeping their records.

Probably the two men with whom you do the most business are the feed dealer and the man to whom you sell the milk. You keep an account with these men, or at least, they keep an account with you. The cows handle all these goods when they convert the feed into milk. Isn't it a business proposition for you to keep a record with them; not with the herd, merely, but with each individual? If you hire three men, so you keep an account with *all* of them? No; you keep an account with *each* of them.

As already suggested, this work takes considerable time if properly carried out. This one objection is being rapidly overcome through the organization of co-operative cow-testing associations. A cow-testing association is a little organization of twenty-five or twenty-six farmers, who own together four or five hundred cows. The Association employs a young man who has had farm experience

and special training in dairying—a man who can make the Babcock test, and compute rations.

This man weighs the feed and milk of all the cows in the Association, tests the milk of each individual cow for butter fat and keeps a complete record of all the feed consumed. He also watches the feed markets and studies the analysis of feeds, so that at any time he can figure out the most economical feeds to buy. The operator or tester spends one day a month with each herd, if the herd is not over thirty cows, and on departing, leaves with the farmer a complete record showing how much every cow has produced; what the product sold for, and how much it cost to feed each cow. You will agree with me that it means a good deal of monotonous work to keep all these records. That is the reason the average farmer does not do it; he considers it too much bother. By having the work done in this co-operative way, there is no bother, as the tester does all the weighing, testing and record keeping. The important thing is that the work is done. The cost of this work is found to be about $1.50 per cow per year. You will say, "why shall I pay a man to do what I can do just as well myself?" Do you do it? Do you keep a record? Most of you do not. You hire men to milk and plow, and help with, don't you? You can do all these things. Isn't it more important to hire two men, if necessary, to keep the record, than to saw wood.

There is not time to take up the feedings that have been made through the cow-testing associations, but I wish to say before leaving the subject that up to July 1, there were seven such associations in Pennsylvania. They were located as follows:

Kennett Square, ... (started 1910)
Downingtown, ... (started 1911)
Canton, ... (started 1913)
Milan, ... (started 1913)
Knoxville, ... (started 1913)
Sugargrove, ... (started 1914)
Altoona, ... (started 1914)

I would like to go into details regarding these associations, but our President referred to the fact that he hoped my talk would have an end, and I am just a little afraid of that cue he's holding so threateningly. I have never been where I "got the hook," although I have often heard of it; but I want to refer to the fact that at the same date (July 1), there were a hundred and sixty-three associations scattered throughout the dairy states of the country. Through these associations hundreds of men have learned that they had been keeping cows year after year that did not pay for their feed. They have learned that they have wasted many dollars in feeding some cows; that the production of their herds was many gallons of milk less than it might have been because of feeding unbalanced rations and under-feeding some cows; that many pounds of butter fat had been wasted in skim milk because their separators were not properly adjusted, or a screw had slipped; that they were paying high prices for mixed rations when they could mix their own at a lower cost.

The members of the oldest association in this country have doubled the profitable production of their herds by studying their record and following the lessons that they teach.

The cow-testing association is the most efficient, economical and workable way in which to increase the returns from the dairy herd.

The cow-testing association deals chiefly with improvement through the female side of the herd. The selection of good cows is not all in the development of the herd. That the bull is half the herd is an old and well-established statement. I want to call your attention for a few moments to the difference in bulls as regards their value as sires. For example, I will take table records of two bulls of the well-known Jersey herd of the Missouri College. The first of these bulls was Missouri Rooter.

Below is given a summary of the record of his daughter and their dams.

	Dams.	Daughters.
Average milk yield,	5380	4381
Average per cent. fat,	4.35	4.95
Average butter yield,	234	216

The bull that I will compare with this one was Missouri Rooter 3rd. The record of his daughter and their dams are as follows:

	Dams.	Daughters.
Average milk yield,	4775	6005
Average per cent. fat,	4.97	4.80
Average fat yield,	238	334

This bull was developed in the herd, and as his value was not realized, he was sold before his daughters came to milking age, and no record was left as to what became of him. Every day valuable bulls are meeting with this same fate. I often have my attention called to a string of fine heifers, well made and uniform, and learn on inquiry, that they are of the same bull and also that the bull was sold because there was danger of breeding his daughters back to him. I am not here to advocate inbreeding, but when one has paid a good price to get a good bull, why sell him before his value is known? The only way to prove a bull is by a comparison of the records of the production of his daughters and their dams. When a bull shows by his offspring that he is capable of getting daughters that are better producers than their mothers, he can, without doubt, be made by means of the most marked and rapid progress in the improvement of the dairy herd. If such a bull is owned in a large herd, he will be used on fifty or sixty cows each year, and his daughters bred to other herd bulls. In the care of the small herd, the bull question is one of the big problems and many farmers are breeding their cows

to anything that will get them with calf. These men could have just as good bulls as any breeders if they would co-operate a little.

There are a number of useful methods of co-operative breeding. The simplest form is for two farms to buy bulls of the same breed, but unrelated, and to exchange bulls at the end of two years, or when their daughters are old enough to breed. The same method may be extended by having two or more farmers own one bull together. The most co-operative plan, however, is what is known as the bull association. This consists of a number of farmers who own about two hundred cows and who are intent upon developing the same breed. The cows should not be too widely scattered. The association buys four bulls. The territory covered by the association is divided into four sections of breeding blocks, and one bull is stationed in each. At the end of two years the bull in block one is moved to block two, and the bull from block two is moved to block three, and so on around the association. By this means each bull may be left in service for eight years with no chance of being led back to his daughters. There can be little doubt that during this time there will be discovered one or more bills that will be of outstanding merit and which shall be kept so long as they are sure breeders.

A bull association may be financed either by the sale of stocks, or the payment of the bulls may be secured by the individual notes of the members. The advantages of such an association are,

1. Owners of small herds have the use of first class bulls.
2. The cost of same is reduced.
3. Bulls are retained until proven, and if meritorious, throughout their natural period of usefulness.
4. A community is given a name for its livestock and buyers are attracted.

Though the bull association is a well established part of the agricultural system of the Scandanavian countries, they have not been developed to any marked extent in this country. However, they are young, and like the cow-testing association, have the support of the far-sighted breeders of the State Colleges and the Dairy Division.

At the present time these associations are located as follows: Maryland, 1; Wisconsin, 1; North Dakota, 1; Vermont, 1; Minn., 1; Michigan, 10.

Now, I appreciate just as much as any of you that I have rambled over a very large subject. Are there any questions?

MR. STEVENSON: Is not over-feeding the mistake most frequently discovered?

MR. GOODMAN: No; I can't say that it is. I think the thing most often discovered is the feeding of a balanced ration not in keeping with the market prices.

The PRESIDENT: The thing most generally found out is that the dairyman does not know the first thing about his cow.

MR. GOODMAN: Yes; I rather think that is what is most generally found out, although that may not apply to you dairymen here

in Pennsylvania. Nevertheless it is a fact that the average dairyman throughout the country knows no more about taking care of his cow than I do about taking care of a baby.

The PRESIDENT: Do you know anything about that?

MR. GOODMAN: Hardly enough to tell; it was only a comparison. Now these conditions demanded that not only should the farmer study his herd; that is necessary if he wants a profitable herd, but it is also an excellent way to fill up that herd.

MR. WELD: In a small herd, would you not risk inbreeding rather than discard a good animal?

MR. GOODMAN: Well, I don't want to go down into history as advocating inbreeding, but I rather think I would.

MR. WELD: If a man keeps his eyes open, it would be all right?

MR. GOODMAN: Yes; if he keeps his eyes open.

A Member: Is it not a fact that all the good breeders do it?

MR. GOODMAN: I don't know that; but it is done.

A Member: Can you tell us anything about the creamery that is to be built in Washington county under government supervision?

MR. GOODMAN: I don't know anything about it, except that the plans are being prepared, and that there is going to be such a thing.

MR. TOMPKINS: There are now twelve cow-testing associations in Pennsylvania, the last one completed yesterday in Susquehanna county through the co-operation of the Lehigh Valley Railroad, State College and the United States' Department.

MR. GOODMAN: Is that at Altoona?

MR. TOMPKINS: No; at Hickory Valley.

MR. GOODMAN: Where is the other?

MR. TOMPKINS: In Chester county. Several years ago I traveled through Pennsylvania, and one day talked with a Chester county man in his oat field. I spoke to him about breeding his own stock, but he showed me two calves nearby, and said it did not pay; they were out of his best stock. He showed me round the place, and finally showed me the sire. Now, I believe the sire must be of the same strain, and, in a dairy animal, must have the milk vein as well developed as the female; this sire did not have it, and he had only two rudimentary teats; that told me why it did not pay that man to raise his own stock.

The PRESIDENT: Any further questions? Mr. Goodman says it was a calamity when that bull in Missouri went to the slaughter. It was a calamity from the standpoint of the breeder; but it is something that often happens in a herd; one sire may be all that could be desired, and another, the worst in the herd; yet the chances are that the good sire will be disposed of before his value becomes known. What are we breeders for, if we do that kind of thing? It is not

for the purpose of putting the best values into our herd by careful selection of the sires? What do you think about it, Mr. Blair—Mr. Stevenson.

MR. STEVENSON: Generally speaking, I think it is the best thing that can be done. I started out breeding first with the idea firmly fixed that Darwin's theory of certain traits being always hereditary was correct. Mendel worked along the same lines, with the same results; but after thirty years breeding along the line that the sires of high-producing cows always produce high-producing off-spring, I can only say that I don't know.

MR. GOODMAN: I believe that possibly it might largely be due to the individual temperament.

MR. STEVENSON: Whenever I find a sire that is capable of transmitting the dominant strain, such as a hornless strain, or anything else, I keep him as long as I can. Of course, you cannot tell whether it is in the direct strain or not. A poll cow bred to a hornless sire will produce some poll sons and daughters every time. In other cases I find it dominant to over 50%. I am working along this theory as best I can, but I am still in doubt. But this I will say: when I have a sire that has proven his high productiveness, I will keep him regardless of what his ancestors were.

MR. GOODMAN: You believe in working on the individual?

MR. STEVENSON: I do.

The PRESIDENT: Only a difference of opinion. If I agreed with you, you'd flop.

MR. GOODMAN: You have succeeded in getting up a very interesting discussion on my rambling remarks, and I thank you for your attention.

The PRESIDENT: Is the Committee on Resolutions ready to report?

The Committee on Resolutions presented the following report, which was unanimously adopted section by section:

REPORT OF THE COMMITTEE ON RESOLUTIONS

WHEREAS, The manufacturers of Oleomargarine are endeavoring to pass laws that are unfair to the dairy business:

WHEREAS, The present law does not limit the moisture content in oleo:

RESOLVED, That we co-operate with the National Dairy Union in its efforts to influence fair legislation and require that oleo not be sold or offered in imitation of butter.

On motion, properly seconded and duly carried in the regular way, this Resolution was unanimously adopted.

RESOLVED, That we approve the action of the Pennsylvania Livestock Sanitary Board in quarantining against disease-infected country in Illinois or elsewhere. All precautions should be taken to keep disease out of our state.

On motion, properly seconded and duly carried in the regular way, this resolution was unanimously adopted.

RESOLVED, That the Pennsylvania Ayrshire Association shall press as an emergency measure, a bill appropriating money sufficient to pay for animals destroyed, and damages inflicted, in the suppression of Foot and Mouth disease.

On motion, properly seconded and duly carried in the regular way, this resolution was unanimously adopted.

The PRESIDENT: Any further committees to report at this time?

MR. STEVENSON: Before we drop this matter of resolutions, I would like to offer another.

There is an experiment now going on in Chicago that is of very great importance to us all. You are all familiar with it; and I move you that it is the sense of the Dairy Union and the Breeders' Association that the exhibitors of pure blood livestock at the Show in Chicago, which have been held in quarantine since the last of October, shall be reimbursed by the Federal Government for the money they have been obliged to expend during this quarantine for feed and care for their animals.

Some of these exhibitors are on the verge of bankruptcy as the result of this quarantine; it takes their all. Unfortunately, the show being held so close to the stockyards, the exhibitors are subject to an enormous charge for feed and quarters. They will be kept in quarantine until it is demonstrated that they cannot transmit the disease to well cattle mixed among them. Out of the eight hundred and thirty or forty, twenty-eight have been lost, two of them from milking sickness. At least so I am informed by a friend of Mr. Skinner's. Now, I know nothing whatever of the foot-and-mouth-disease, but I have a heart-felt sympathy for these men; I believe it is really a good way of determining whether it is possible to save this herd to the world, or, in fact, whether it is possible to do anything for any herd if it becomes infected with the foot-and-mouth-disease, and if rigid quarantine will help it, we should be willing to do what we can to help those who have to suffer by it.

I, therefore, move that it is the sense of this meeting that the Federal Government should reimburse these men for their loss in connection with this quarantine.

This motion was properly seconded and duly carried in the regular way.

The PRESIDENT: We have asked Dr. Marshall to come down here and talk to us about the foot-and-mouth-disease and have a free discussion on the subject. Some of you no doubt feel that Dr. Marshall has been unnecessarily strict in this matter, and you will all be free to ask any questions and give your experience. In view of the number who will want to say somehting, I think we shall have to limit each man to five minutes. How about it? Silence gives consent. Mr. Bailey will be time-keeper.

MR. STEVENSON: He's easy.

The PRESIDENT: Not so easy as he looks; I have to pay my milk bill.

MR. STEVENSON: That's because he knows you.

MR. BAILEY: I must pay my paper in advance, but he only pays his milk bill after he has used the milk.

The PRESIDENT: Any further reports before Dr. Marshall begins to speak?

MR. GORHAM: Well, I have the report of the Auditing Committee.

The PRESIDENT: Let's have it.

STATEMENT ON ACCOUNT

J. F. LANTZ, with the Breeders' Association

Receipts

Balance from last audit,	$147 74
Dues received from Secretary,	19 30
Seed corn sold at auction,	86 00
Seed corn sold by State College,	40 00
Dues,	40 00
Total receipts,	$333 04

Expenditures

Account book,	$2 00	
Prize cup,	5 00	
Badges,	4 75	
Premiums, prizes, corn show,	109 50	
Expenses York meeting (Plant Breeders' section),	10 68	
Expenses lecturer (Gilbert),	22 60	
Printing and stationery,	5 60	
Postage,	1 00	
Paid on note,	130 00	
Total disbursements,		$291 03
Balance on hand,		$42 01
		$333 04

There is a note for $500.00 against the Breeders' Association.

(Signed) W. R. Gorham, Chairman Aud. Com.

STATEMENT OF ACCOUNT

W. E. PERHAM, Treasurer, with the Dairy Union

Receipts

Cash subscribed for prizes,	$40 00
Butter sold from exhibits,	42 45
Rent floor space at York,	42 63
Dues,	41 00
Toatl receipts,	$166 08

Expenditures

Balance due Treasurer from last audit,	$155 81	
Printing,	21 90	
Expense speaker (Cornelinson),	10 36	
Express,	3 90	
Badges,	55 00	
Prizes,	24 00	
Stenographer,	217 50	
Telegrams .60, postage $10.00,	10 60	
Silver cups,	68 67	
Total expenditures,		$567 80
Balance due Treasurer,		$401 72

(Signed) W. R. Gorham, Chairman Aud. Com.

The PRESIDENT: What shall be done with this report?

On motion, properly seconded and duly carried in the regular way, it was unanimously accepted.

The PRESIDENT: Any further reports or announcements?

MR. NORTON: I am this morning in receipt of the following letter which I would like to have entered on the minutes of the proceedings:

Scranton, Pa., Jan. 27, 1915.

Mr. W. C. Norton,
Penna. State Breeders' Association,
Harrisburg, Pa.

Dear Mr. Norton:—On behalf of the Agricultural Department of the I. C. S. we would like to invite any members who find it convenient to visit the buildings and demonstration farms in our institution in Scranton and Dalton, Pa., respectively, any time during or immediately after the present session. I will be very glad to make arrangements to furnish guides to entertain the members to the best of our ability.

With best wishes for the success of your meeting, I am,

Very truly yours,

(Signed) H. O. SAMPSON,
Principal, School of Agriculture.

The PRESIDENT: I will ask Mr. Norton to convey to the I. C. S. the thanks of this Association for the invitation, and if any of the members can make it convenient to go by that way and accept it, I have no doubt they will be amply repaid.

Anything further before we proceed with Dr. Marshall? If you have anything, now is your time. It seems that we're all ready now to hear what Dr. Marshall has to tell us about the Foot-and-Mouth-Disease. He will now address us:

Dr. Marshall spoke as follows:

APHTHOUS FEVER

By C. J. MARSHALL, *State Veterinarian.*

In the Fall of 1908 there was an outbreak of the Foot-and-Mouth Disease in Pennsylvania. It originated in Michigan and was carried to various parts of Pennsylvania by cattle shipped from Buffalo. There were eight points of infection received about the same time. The infection extended over an area of one hundred miles in length and in the part of the state where animal husbandry is most ex-

tensively practised. The infection was found on one hundred farms. One thousand three hundred and twenty head of cattle, 877 swine, 52 sheep and 3 goats were diseased or exposed to the infection. They are appraised at $57,702.49, promptly killed, buried and the premises were disinfected. The cost of disinfection averaged about $100 per herd. All told this outbreak cost a little over $86,000. The Federal Bureau of Animal Industry paid two-thirds of the appraised value of the livestock destroyed and the cost of disinfection. The State paid the balance. It required three months to stamp out the disease at that time. The State was then free from Aphthous Fever for a period of six years.

The recent outbreak was discovered on two farms in Lancaster county and in one cow in the Union Stockyards at Pittsburg on October 24, 1914. The infection has existed in something over 630 herds in 27 counties in Pennsylvania since that time. Infection was carried from the stockyards in Chicago through Pittsburg and Lancaster to various places in Pennsylvania in a period of less than two weeks. Five days previous to October 24th we were notified that the disease had been diagnosed in two counties in southern Michigan and two other counties in northern Indiana. In the meantime our cattle shippers, commission men and over eight hundred veterinarians had been warned that the disease had been found in this country and that all should be on the lookout for symptoms of Aphthous Fever. In many cases infected herds were located and quarantined before suspicious symptoms had been observed. Seven administration districts had been established in the infected territory with the head office at Harrisburg. Each district was in charge of an experienced agent of the federal and state government. The federal inspectors were appointed agents of the State Livestock Sanitary Board and cards of indentification were issued to each so he could work under the State law. About one hundred and fifty trained veterinarians were employed by the federal and state governments. The work, expense and responsibility were shared about equally by each. The work of locating and exterminating the disease was made easy from the first by the mutual co-operation of commission men, dealers, railroads, herd owners, local veterinarians, and the experienced officials in charge. The first class helped greatly by furnishing free access to records of shipments and sales. In many cases the disease was recognized and reported by the owner.

This outbreak has been the worst calamity to our stock raising industry that has ever occurred in Pennsylvania or in North America. It was forced upon us with practically no warning and came in the nature of a flood, earthquake or monstrous conflagration. Something of the extent of the disease in this country will be obtained from the following table, which was submitted this date by the Bureau of Animal Industry:

STATEMENT SHOWING PROGRESS OF WORK OF ERADICATION OF FOOT-AND-MOUTH DISEASE

State	Number of counties in entire State*.	Numbre of counties infected.	Number of herds infected.	Number of cattle infected.	Number of sheep infected.	Number of goats infected.	Number of swine infected.	Total number of animals infected.	Number Inspectors at work Jan. 1. Veterinarians.	Number Inspectors at work Jan. 1. Laymen.	Progress of work in State, Jan. 15, 1915.
Connecticut,	8	2	24	538	....	....	105	643	7	2	Completed§.
Delaware,	3	1	12	152	....	....	49	201	3	6	Completed.
Dist. of Columbia,	....	....	2	28	....	....	5	28	4	6	Completed.
Illinois,	102	50	484	14,653	507	11	21,587	36,758	110	48	Progressing rapidly†.
Indiana,	92	18	94	2,172	615	....	3,340	6,127	25	18	Near completion.
Iowa,	99	6	32	979	32	....	1,581	2,592	13	10	Near completion.
Kentucky,	119	9	39	817	....	....	531	1,472	22	11	Completed.
Maryland,	24	10	39	744	197	....	531	1,472	22	11	Completed.
Massachusetts,	14	9	50	1,109	9	4	3,471	4,593	17	14	Slaughter completed.
Michigan,	83	15	236	2,922	802	....	4,004	7,728	35	23	Slaughter completed.
Montana,	31	3	32	1,408	237	....	11	1,656	17	6	Completed.
New Hampshire,	10	1	2	78	....	....	26	104	3	2	Slaughter completed.
New Jersey,	21	5	23	743	6	....	212	961	10	....	Completed.
New York,	61	11	85	3,570	60	2	267	3,899	35	51	Completed.
Ohio,	88	31	169	3,204	2,652	1	4,254	10,111	33	20	Nearly completed.
Pennsylvania,	67	25	654	11,059	269	3	6,565	17,896	60	31	Nearly completed°.
Rhode Island,	5	3	36	721	1	....	135	857	6	16	2 counties completed.
Virginia,	100	1	1	19	....	....	15	34	3	....	Completed.
Washington,	38	1	1	102	....	....	....	102	3	....	Completed.
Wisconsin,	71	10	31	1,255	1,764	1	1,269	4,289	21	10	Slaughter completed.

*Number of counties in each state given in order to show approximate area of State involved.
§This means all herds slaughtered and disinfection completed. House-to-house canvass still going on.
†About 40% of all infection in the United States was in this State. Increasing number of inspectors available are rapidly clearing up the work. Less than 20 herds alive at last report.
°About 6 infected herds alive.

We were fortunately prepared to meet the emergency. While the experience is fresh in our minds we should decide on measures that could be safely adopted to handle a similar emergency more efficiently, if possible, in the future. It is not safe to be unprepared for calamities of this kind. Safe and sane measures are hard to promulgate and enforce during the existence of such a plague. In times of peace we should prepare for war. The plan of extermination successfully used in the outbreaks of 1902 and 1908 was adopted in dealing with this one. As soon as the disease was reported to the Board each member favored continuing the work of extermination along the same lines that had been used six years ago. The same general plan was followed by the Bureau of Animal Industry in the twenty states in which the infection was found.

It was first necessary to locate the diseased herds. Agents were sent out at once to trace suspicious shipments. When a diseased animal was found all the cattle, hogs and sheep on the premises were placed in quarantine. In all cases the diagnosis was confirmed by the state and federal agents. Both representatives were satisfied that the diagnosis was correct. The diseased and exposed cloven-footed animals on the premises were then all appraised at their actual value and arrangements made by digging the burial trenches. In some cases the work was done by the owner of the herd, while in others contractors did it. In either case the expense was borne equally by the federal and state governments. The animals were then killed, covered with one hundred pounds of lime to each one thousand pounds of estimated animal weight and buried in a grave seven feet deep, seven feet wide, and two feet in length for each mature bovine animal. Next the stable was carefully cleaned and disinfected. The owner will not be permitted to re-stock with cloven-footed animals for sixty days from the time the premises were disinfected. In the meantime a farm to farm inspection will be made within a radius of three miles from the infected herd and each susceptible animal will be examined for any evidence of the disease. During this time the township is held in quarantine and it is necessary to obtain a permit to move hay, straw, cattle, sheep, swine or hides.

In the beginning of the outbreak a quarantine was placed upon the whole State. This precaution appeared necessary for the reason that the disease was so wide-spread. The counties into which no interstate shipments had been made between October first and twenty-fourth were released from quarantine as soon as the records of sales and shipments were traced. A few counties had received such shipments and upon examination the animals were found free from infection. These counties were promptly released from quarantine by the State, but not by the Bureau of Animal Industry. It was soon considered safe to release certain townships in counties that had considerable infection. The disease was found in twenty-seven counties. Some counties had but one or two diseased herds. The counties that received the most infection were Lebanon, Lancaster, Berks, Montgomery, York, Bucks and Chester. The farmers in these six counties keep many cattle. It is their custom to purchase feeders in the fall and finish them for beef during the winter. Their purchases are usually made at the season of the year when

this infection occurred. At no other time could the infection have been spread so extensively and rapidly.

Number counties in State infected,		27
Number of herds in the State,		627
Number of animals appraised:		
Cattle,	13,088	
Sheep,	313	
Swine,	6,871	
		20,272
Amount of appraisement,		$787,573.18

Aside from the expense, six hundred and twenty-seven herd owners have been tied up and prevented from carrying on the winter's work. Traffic in cattle, sheep, hogs and crops has been practically at a standstill in many parts of the State. In most cases people have met the losses and embarrassment boldly and with but one purpose and that was to get rid of the disease as soon as possible. In practically every case the main objection or criticism was that it was too long from the time a diseased herd was found till it was destroyed and the premises disinfected. In most cases people were reasonably patient in this respect. Some have wondered if a less destructive method might not be safely used for exterminating the disease. This is not to be wondered at when one considers that the death rate from the disease is so low. It is known that practically 95% of the cases will recover with no treatment except reasonably good care. In a number of cases in the recent outbreak, the effected animals had recovered before they could be destroyed. The reasons for taking such extreme measures in dealing with this disease is not due to the high death rate, but to the fact that it is easily transmitted from animal to animal and from place to place, and it does cause a depreciation in the value of the affected animals to the extent of about twenty dollars per head.

We realize that the disease is not highly fatal and that recovery will take place in a high percentage of cases without even a learned course of treatment. It is one of the most highly contagious diseases of cloven-footed animals, and while the death rate is comparatively low the losses to animal industry are considerable. The disease has gained a foothold in nearly all European countries and it is practically impossible for them to adopt our method for exterminating it. It is necessary to hold infected herds in quarantine for something over three months. A recent investigator in the Netherlands where the disease is common, has shown that it cost practically $20 per head in each infected herd to handle the disease in quarantine. This is the best they can do after many years of experience in trying to control it by the quarantine method. Their expense is figured on the loss in milk production, loss in condition of meat producing animals, loss from work in oxen, death from the disease and extra cars given to those that are sick. It is doubtful if a hard owner in this country could afford to have Aphthous Fever in his herd for $20 per head. This would not include the expense to the State and Federal government for enforcing the quarantine. It has already cost $120 per head to care for the prize dairy herd at Chicago. If this method were adopted there would be constant unrest in the neighborhood of an infected herd. It would be necessary to increase the inspection force to locate new centers of infection and prevent the disease from

spreading. The quarantined herds should be under constant Federal or State supervision. Neither the State nor Federal government could be expected to remunerate the owners for losses sustained during the course of the disease. It has been demonstrated in all foreign countries that this method will not exterminate the disease. We cannot do something that they have failed to accomplish. It will take us years to develop Veterinary Sanitary Police Regulations for handling Apthous Fever by the quarantine method that is as good as theirs. We cannot afford to even experiment with it. It would be a calamity to the cattle, swine and sheep industry of this country to have this disease get beyond our control.

Careful records were kept by Dr. Rudovsky of the average losses by this disease in Austria. In 13,858 head of cattle on 91 farms belonging to sugar factories, and 2,054 head on 802 small farms, the loses from milk decrease, oxen incapacitated for work, loss of condition in all animals, natural death and compulsory slaughter, amounted to about $20 per head. He estimates an annual loss of over a million dollars in Austria. This is a safe estimate for the losses each year in the countries of Continental Europe. Infection comes from Russia and other Eastern countries where animal hygiene measures are practically nothing and it passes rapidly westward to sections of Europe where veterinary police regulation are most perfect. It has been practically impossible to exterminate Aphthous Fever from the herds in France, Belgium, Switzerland, Italy, Germany, Austria and Holland for the reason that fresh infections are constantly being brought in from Russia, Roumania, Turkey, Siberia, etc.

The policy followed by many foreign countries is to adopt rigid quarantine measures. No animals are killed on account of this disease unless they become worthless. For them perhaps this is the cheapest and best policy but for the people in North America, where we are surrounded by water and ice, and the infection is brought in only occasionally, it seems best to continue the plan so successfully used in all past outbreaks. The disease cannot be considered as a source of danger to man. Its principal importance is an economic question. If property must be destroyed and animals slaughtered for the public good the owners should be compensated for their entire loss, provided it can be shown that the disease was brought about by no fault of the owner.

Under the present law, our Board is limited in amount of indemnity that can be paid for animals that it is deemed necessary to destroy, to $70 for a registered bovine, $40 for non-registered bovine and $10 for a sheep or hog. The United States Government will duplicate these amounts in the present outbreak, but some animals have been destroyed that are worth from twenty to forty times the amount allowed by law. Should not the law be fixed so that it would be possible to pay full value for such animals when it becomes necessary to destroy them for the benefit of the State or country? The diseases from which such extreme measures are necessary are but few. Aphthous Fever is the only one with which we have had to deal so far. Rinderpest is equally as important and there is no positive assurance that our herds may not become infected with it. The dangers from these diseases have increased wonderfully in the past few years by the progress made in the transportation.

Rapid progress has been made in destroying the infection from the present outbreak of Aphthous Fever. The payment for property and stock destroyed has necessarily been held back. Under normal conditions the Board had money sufficient to meet its obligations up to June first, 1915, when the present appropriation was to terminate. The Board has now petitioned the Legislature for $558,000 to reimburse the owners for losses sustained. Let us trust that the Legislature can and will make the necessary appropriation so the bills can be paid without delay.

The Bureau of Animal Industry petitioned for $2,500,000 to pay its half of the expense in this and other states. The appropriation has been made and is now available.

In the previous outbreak of 1908, all just bills were promptly paid. For this reason it has been much easier to convince the people that they would be paid for their losses this time.

Infection during the present outbreak was carried from the original to other farms in a few cases. In nearly every place it was carried in refuse and utensils from creameries to which milk from infected herds had been sent. If the creamery refuse had been pasteurized as required by law, thousand of dollars would have been saved and much annoyance prevented.

Every state should be prepared with laws, rules, regulations, agents and money to fight Aphthous Fever, rinderpest and all other transmissible diseases of livestock. The fight should be determined and persistent. A herd owner should not be a menace to his neighbors and no state should send Aphthous Fever, hog cholera, tuberculosis, glanders, etc., to other states to jeopardize their livestock interests. This cannot be done without efficient official supervision and a strong public sentiment on the part of herd owners in favor of genuine co-operation with federal, state and local authorities.

It is hoped that you will feel that the work of exterminating the disease has been honestly and promptly done and that money will soon be available for paying all just claims.

The following order of general quarantine adopted by the State Livestock Sanitary Board, January 27th, 1915, supersedes the order of general quarantine adopted December 30th, 1914, and shall become effective February 1st, 1915.

"The fact has been determined by the State Livestock Sanitary Board and notice is hereby given that Foot-and-Mouth Disease which has been and is adjudged and proclaimed by the said Board to be of of transmissible character, exists in livestock in certain sections of Pennsylvania and it is deemed advisable to release from quarantine all territory in Pennsylvania except the counties of Lancaster, Lebanon, Lehigh and York, and also the townships of Berwick, Conewago, Germany, Hamilton, Mt. Pleasant, Oxford, Reading and Union in Adams county; Franklin, Penn, Reserve, Robinson and Ross, also the Boroughs of Bellevue, McKees Rocks, Aspinwall, Avalon, Ben Avon, Ben Avon Heights, Braddock, Crafton, Edgewood, Emsworth, Etna, Green Tree, North Braddock, Rankin, Swissvale, Thornburg, Turtle Creek, Verona, Westwood, Wilkinsburg, also the 14th, 20th, 23rd, 24th, and 26th Wards, City of Pittsburg, in Allegheny county; South Beaver in Beaver county;

Albany, Alsace, Bethel, Brecknock, Caernarvon, Cumru, Greenwich, Heidelberg, Lower Heidelberg, North Heidelberg, Hereford, Jefferson, Maiden Creek, Marion, Maxatawny, Muhlenberg, Ontelaunee, Penn, Richmond, Robeson, Rockland, Spring, Tulpshocken, Upper Tulpshocken, Washington and Windsor in Berks county;

Bedminster, Bridgeton, Durham, East Rockhill, Haycock, Hilltown, Milford, New Britain, Nockamixon, Plumstead, Richland, Springfield, Tinicum, Warrington, West Rockhill and all territory in Buckingham and Solebury north of the Doylestown and New Hope Pike in Bucks county; East Penn and Mahoning in Carbon county; Birmingham, East Bradford, West Bradford, East Brandywine, West Brandywine, Caln, East Caln, West Caln, Elk, East Fallowfield, West Fallowfield, East Goshen, West Goshen, Highland, Honeybrook, Londonderry, London Grove, East Marlboro, West Marlboro, East Mantmeal, West Mantmeal, Newlin, East Nottingham, Lower Oxford, Upper Oxford, Penn, Pennsbury, Pocopson, Sadsbury, Thornbury, West Sadsbury, Upper Uwchlan, Valley, Wallace, Warwick, Westown, West Whiteland and Willistown in Chester county; Madison in Columbia county; Lower Allan, Monroe, Silver Spring, Southampton and Upper Allen in Cumberland county; Conewago, Derry, East Hanover, South Hanover, West Hanover, Londonderry, Lower Paxton, Swatara and Lower Swatara in Dauphin county; Aston, Bethel, Birmingham, Concord, Darby, Upper Darby, Edkmont, Haverford, Marple, Middletown, Lower Providence, Upper Providence, Springfield, Thornsbury, and Tinicum in Delaware county; Antrim, Greene, Peters, Montgomery and Southampton in Franklin county; Fairfield and Loyalsock in Lycoming county; Granville, North Derry, South Derry and West Derry in Mifflin county; Douglass, Franconia, Frederick, Upper Gwynedd, New Hanover, Upper Hanover, Hatfield, Limerick, Marlboro, Montgomery, East Norriton, West Norriton, Perkiomen, Lower Providence, Upper Providence, Salford, Lower Salford, Upper Salford, Skippack, Towamensing and Worcester in Montgomery county; Anthony, Derry, Limestone, Mahanoy and Valley in Montour county; Bethlehem, Forks, Hanover, Lower Saucon, Palmer, Washington and Williams in Northampton county; Jackson, Jordan and Lower Mahoney in Northumberland county; Center, Miller, Oliver and Wheatfield in Perry county; Branch, North Manheim, South Manheim, Pinegrove, Reilly, Tremont, Washington and Wayne in Schuylkill county; and Allegheny, Derry and Upper Burrell in Westmoreland county, including all cities and boroughs located in the aforesaid area.

Therefore, the State Livestock Sanitary Board, under authority conferred by law does hereby establish a general quarantine throughout the aforesaid area, including all cities and boroughs located within the said area, subjecting to said quarantine all cattle, sheep, other ruminants and swine, also hay, straw or similar fodder, hides and skins.

The said quarantine area is divided as follows:

(a) Closed area: All territory within a radius of three miles of an infected premises that has been disinfected for less than fifteen days.

(b) Exposed area: All territory in a township or municipality beyond the limits of a closed area, also all townships or municipali-

ties containing infected premise that has been disinfected for less than thirty days.

(c) Modified area: All territory not included in a closed or exposed area.

IT IS HEREBY ORDERED, First: The movement of cattle, sheep, other ruminants and swine or within any closed area is absolutely prohibited, and the movement of dressed carcasses of such animals, the hides, skins, or hoofs of such animals, and all hay, straw or similar fodder may be moved only on official permit.

Second: The movement of cattle, sheep, other ruminants or swine from or within any exposed area is permitted for immediate slaughter after inspection and certification, and into which such animals may be moved for any purpose; also from which the movement of dressed carcasses of such animals, the hides, skins or hoofs of such animals, and all hay, straw, or similar fodder may be moved on official permit.

Third: The movement of cattle, sheep, other ruminants or swine from or within any modified area is permitted for immediate slaughter without inspection, and into which such animals may be moved for any purpose; also from which the movement of dressed carcasses of such animals, the hides, skins or hoofs of such animals, and all hay, straw or similar fodder is permitted without any restrictions.

Fourth: All permits must be taken out in advance and must be held by the person in charge of and accompanying the animals, and must be kept available for inspection. If shipment is made by rail, the permits must be attached to the waybill.

Fifth: When cattle, sheep, other ruminants or swine are transported within or from any exposed or modified area, clean and disinfected cars or conveyances must be used. All such cars or other conveyances must be cleaned and disinfected before being again used for any purpose.

Sixth: All receptacles, cars or conveyances used in transporting hides, skins, or hoofs from one point to another within or from any closed or exposed area must be cleaned and disinfected before being again used for any purpose.

The movement of hides, skins or hoofs in cars or other conveyances that contain other merchandise, is prohibited, unless said hides, skins or hoofs are in a covered, water-tight receptacle.

Seventh: Collecting carcasses of cattle (including calves), sheep or swine, also hides or skins of such animals at farms situated within any closed area is prohibited.

Eighth: Public sales or exhibitions of cattle, sheep, other ruminants or swine within any closed area are prohibited, and in exposed or modified may be held on official permit.

Ninth: Shipments of cattle, sheep, other ruminants or swine into Pennsylvania from sections now under Federal quarantine in the State of Illinois, including the Chicago Stockyards, for any purpose, are absolutely prohibited.

Tenth: No cattle from points outside of Pennsylvania will be permitted to enter Pennsylvania for purposes other than immediate slaughter.

Eleventh: The general quarantine proclaimed hereby supersedes the general quarantine proclaimed December 30, 1914, shall become effective February 1, 1915, shall be maintained in force until officially revoked by the State Livestock Sanitary Board, and for the purpose of identification shall be known as Form 168.

Violation of any of the foregoing orders will be prosecuted according to the Act of July 22, 1913.

(Signed,) STATE LIVESTOCK SANITARY BOARD,
By C. J. MARSHALL,
State Veterinarian."

Here is a map showing the free and closed area in the State of Illinois, including the St. Louis Stockyards.

Now, if there are any questions, let's have them. Many of you probably think that we have been unnecessarily severe in our measures to stamp out this disease; if you have anything to say, let's thresh it out; I am not thin-skinned, and am ready to listen to anything you may have to say, and explain, to the best of my ability, our position in the matter.

MR. STEVENSON: The last outbreak was traced to Michigan. Is this present outbreak traced there too?

DR. MARSHALL: That is to be determined. We know that the disease has been there during this present outbreak, but its source has not yet been definitely determined.

MR. STEVENSON: Of course, we know that the show was close to the livestock yards in Chicago, and the fine herds were exposed.

DR. MARSHALL: Well, it was roped off. I was there myself.

MR. STEVENSON: Well, these cattle cannot be replaced.

DR. MARSHALL: Yes, but you will see that it is a pretty expensive thing to try to save it. You tie up the Chicago stockyards, and you lose a million dollars a day.

A Member: When was the quarantine lifted from fox hunting?

DR. MARSHALL: Not until the disease was stamped out.

A Member: Well, in our section it has been going on all along, and the dogs running loose.

DR. MARSHALL: Well, I know the Board has been criticised for it, but I am willing to take the blame for it.

MR. STEVENSON: I have been told that the disease has practically been stamped out of the prize herd at Chicago.

DR. MARSHALL: No; I think not; seven of the animals have been killed.

MR. STEVENSON: You say you have heard that seven of the animals have been killed? That is very unfortunate if it is true.

DR. MARSHALL: Well, I got it from Dr. Dyson, and Hughes, the man who has charge of the herd.

MR. STEVENSON: Well, my information came from Mr. Skinner, secondhand.

A Member: Well, I know positively of the death of two of these animals; they died of———

MR. STEVENSON: That follows foot-and-mouth disease.

A Member: Does cold help to keep the disease from spreading?

DR. MARSHALL: Yes, in this respect: it tends to keep the cattle in the stable and prevent the spread of the disease.

A Member: But your dogs travel all over the country.

DR. MARSHALL: You want to know whether freezing weather will kill the disease? It will not.

A Member: In a field where the cattle were killed about two months before, is there danger of the dogs tracking over that field?

DR. MARSHALL: A little, but not much; put some lime on it at once.

A Member: If the sunlight gets on that field up to the first of May, will it make it safe?

DR. MARSHALL: That is five months yet. There is only one case I can tell you about. A case was discovered in a barnyard, but the yard and the rack were disinfected. Five months afterwards that rack was moved, and the disease broke out all over the farm.

A Member: I believe there are light cases of the disease that do not become public, and may cause an outbreak later on.

DR. MARSHALL: Well, we found a case like that yesterday in the upper end of Northampton county. The owner was dissatisfied; some believe he knew, but of this we are not positive; but we do know of no other case where there was no infection of the herd.

MR. BAYARD: Near the railroad track?

DR. MARSHALL: Yes.

MR. BAYARD: Well, they have a case like that in Ohio, where the animal contracted the disease in crossing the track; it is supposed to have dropped from the car in droppings or straw, dropped from the car.

A Member: Can it not be carried by the local veterinarian?

DR. MARSHALL: Yes; but we have instructed them to be very careful and dress in rubber suits, gloves, etc. We have one case where the veterinarian went around doctoring a case, and he was not careful with his clothes. If any of you know of cases of this kind, report them at once. We will take it as a favor, and the offending veterinarian will be fired at once. They must wear rubber suits, and these must be cleansed in a bichloride solution. We have had

no complaints of their getting drunk, and getting five dollars from every farmer whose premises they disinfected.

A Member: If a veterinarian has no rubber suit, but puts his clothes in a formaldehyde solution, would that be all right?

DR. MARSHALL: Yes; that would be safe.

A Member: How about a creek running past a place; could the disease be carried in that way?

DR. MARSHALL: The danger would be very slight, but it is wise to take every precaution.

A Member: Did you ever have a case where there was no contagion, but it was constracted by the animal crossing a stream?

DR. MARSHALL: Was it a Holstein?

A Member: No; it was a man by the name of Keller, and I have been informed that he was not inspected.

DR. MARSHALL: Dr. Hickman knows better.

A Member: Dr. Hickman told me.

MR. STEVENSON: Do you think it safe after a man has been in Harrisburg for a week, to go into his stable?

DR. MARSHALL: I think so.

MR. BAYARD: Nothing here but live herds.

A Member: What are the symptoms?

DR. MARSHALL: Elevated temperature, cow droopy, hair sticking the wrong way, don't want to eat; same symptoms, but no fever; then limp a little, and then comes a blister in the mouth, and the animal begins to slobber; then the foot begins. The first thing is to take the temperature.

A Member: Any other disease have the same symptoms?

DR. MARSHALL: Foul claw is very much like it.

A Member: Can't you tell by the smell?

DR. MARSHALL: No; I think not.

A Member: Is it possible to reduce that high temperature by medicine?

DR. MARSHALL: Yes; but it goes down anyhow within twenty-four hours.

A Member: Well, does that temperature follow in foul claw?

DR. MARSHALL: Oh, no; it does not make them sick; just limp a little and then are perfectly well.

A Member: Is it not possible that it would be safer to have the clothes disinfected before examining the herd?

DR. MARSHALL: Oh, yes; our inspectors always do it. I know several dairymen who will not allow an inspector to examine their herds without first disinfecting, and we are glad to have the people talk that way.

A Member: In a book issued by the Federal Government, the symptoms of stomachtitis are given as almost the same as in the foot-and-mouth disease. Can you tell us the difference between them?

DR. MARSHALL: Well, that is just a severe form of inflammation of the mouth, in which the animal often slobbers; it is supposed to be due to a fungus feed. The best thing is to put the animal by itself and feed it properly, so that none of the other animals will take it.

A Member: Does not ensilage have something to do with it?

DR. MARSHALL: Very often.

A Member: Was it not mistaken for this Michigan?

DR. MARSHALL: Micardis stomachtitis? Yes.

A Member: Doesn't that happen very often?

DR. MARSHALL: Yes; very often; you will often find scabs on the teats. It often comes from garlic.

A Member: I have heard you say that there is no inflammation of the foot in stomachtitis.

DR. MARSHALL: Well, unless there is foul claw in connection with stomachtitis, there is not; but it is best to separate the cow, so as to be on the safe side.

A Member: Well, if you had forty cows, and twenty of them developed these symptoms, it would keep a man guessing.

DR. MARSHALL: Do you notice them salivating very much? It is very easy to recognize it when it is in the country.

A Member: Do you think it possible for a herd to become immune after it has been exposed to the disease?

DR. MARSHALL: Yes; the immunity will last in some cases for six months, and in some cases for a year, and some never have it back again. In the Netherlands about 75 per cent. of the herd develop the disease, and about 25 per cent. develop immunity; but you cannot count very much on the immunity produced.

A Member: Do you think that if the animals in the Dairy Show get over it they will transmit it to another animal in the course of six months or a year?

DR. MARSHALL: Well, I don't think so. I think we will be reasonably safe if the animals are released. They are taking every precaution, and when these animals are released by the Federal Government, I think we need have no fear of infection. I know that in Minnesota they have taken the same stand as we have, and when the animals are released they will receive them.

MR. STEVENSON: That is exactly what I want to say; you have covered the ground thoroughly.

MR. BAYARD: That is the only time George Stevenson has agreed with anybody this week.

MR. REINHOLD: I believe we should go on record that the National Dairy Show shall hereafter be held not in connection with the Livestock Yards at Chicago.

MR. STEVENSON: Not only the Dairy Show, but the Cattle Show.

A Member: No cattle show of any kind in connection with any stock yard.

The PRESIDENT: Now, I take it that it is the sense of this Association that no show of pure bred cattle should be held in connection with any stockyard?

PROF. TOMHAVE: I don't think we should go on record as passing a resolution quite as strong as this. Wait and see what is going to transpire. I don't think the Breeders' Association wants to go on record that in the future no International shall be held in Chicago.

MR. VALMAN: That, I think, would be like locking the stable after the horse is stolen. I don't think that in the future we will jeopardize our stock by an exhibition held in Chicago, or at the Chicago Stock Yards. There are lots of other places in Chicago where we can hold our Dairy Show. We do not save anything by holding the shows at the stockyards. It is the most expensive place—I have paid $40 a ton for hay, when I could buy it at home for fourteen dollars, and was not allowed to carry it in. The main reason that cattle come from all parts of the United States, is because the show is held close to the stockyards, but I think I am safe in saying that this trouble would not have happened if the show had been held on the other side of Chicago. I am speaking only as a Dairyman—not as a breeder. Most of the beef cattle go out into the stockyards when the show is over.

The PRESIDENT: It occurs to me that the stockyards in Pittsburgh are the safest place for cattle in Pennsylvania today.

PROF. TOMHAVE: I don't want to dispute what this gentleman says, but I do not believe the Show will be a success if held anywhere but at the Chicago Stockyards.

MR. BAILEY: I am not a breeder, but I handle livestock, and in shipping it, you have to unload at the stockyards within thirty-six hours, and it is impossible to ship your cattle from your own farm without running some risk.

MR. FIELDEN: I have shipped as many as eight thousand, and never unloaded them from Massachusetts to Iowa, but I had may cars fitted up so that I could take care of them.

The PRESIDENT: Is that allowed? I thought they had to rest.

MR. FIELDEN: No; not if they are properly fed and watered, and I always see that this is done.

A Member: If you are willing to take the risk yourself.

PROF. TOMHAVE: I wish to amend the motion before the house so as not to include fat cattle.

This amendment was properly seconded and duly carried in the regular way.

The PRESIDENT: Then the motion resolves itself into this: that the National Dairy Show should not be held at the Chicago Stockyards.

The motion as stated by the President was properly seconded and duly carried in the regular way.

The PRESIDENT: I guess I'll have to tell you how Dr. Munce helped to spread the foot-and-mouth disease. He's too modest to tell it on himself, or perhaps he's trying to forget it; but the boys won't let him. It's the joke of the Pittsburgh Yards.

DR. MUNCE: I think I had better tell this story myself, rather than let Bayard tell it, although I'm trying to forget it.

Now the situation is this: when the Pittsburgh yards were quarantined early in November last, it was necessary to watch the yards very closely, and when it became necessary to move cattle it could be done only on permit for immediate slaughter. Now the men were issuing these permits as fast as possible, and I volunteered to help them out. Among those who applied for a permit to move some hogs was a butcher from Beaver, I think he said—in fact I am trying to forget everything connected with this thing—and I issued a permit to him permitting him to take these hogs out for immediate slaughter, signing Dr. Jones' name to it. He moved the hogs, out to the slaughterhouse in the country, but did not slaughter them immediately, and the disease developed there. Now the boys at Pittsburgh think they have a great joke on me.

The PRESIDENT: The boys at Pittsburgh say you came down to Pittsburgh with the disease, because it was the only case in which the disease developed.

DR. MUNCE: I will say that it is the one case that developed out of several thousand that I let go through.

The PRESIDENT: But you are willing to buy? Well, we'll let it pass; it was only an accident.

A Member: But, Doctor, how about the fat cattle that came through quarantine?

DR. MARSHALL: They come from the southern part of Illinois and Ohio; if you will look at the map that has been passed around, you will see that Southern Illinois is a free area.

MR. BUCKLEY: I would like to ask Dr. Marshall what sort of disinfection is taking place on the cars that bring these animals. There are many cases I have heard of where the danger of contagion

does not come through the animals as through the cars in which they were shipped.

DR. MARSHALL: These cars are very carefully disinfected. When the stock is moved from or into a quarantined district, orders are given that the car must be carefully disinfected, and then thoroughly cleansed and scalded and sent to a central point for further disinfection. Around Philadelphia they have to go down to Point Breeze. The government is very careful and so is the railroad.

MR. FIELDEN: About the time we are careful is the time there is an outbreak of the disease. Now, what starts it in the beginning when there is no epidemic anywhere? And it is the same with hog cholera.

DR. MARSHALL: We don't bother unless we know of cholera. Then we notify the breeders that the car must be disinfected. Otherwise when we do not know of any, we don't bother. The government is very careful about interstate shipments, and the railroads are also usually very careful.

MR. FIELDEN: I believe there is very little done in regard to this. I am not a crank on legislation, and there is too much against the railroads already, but I do think something should be done to disinfect the cars where livestock is carried.

A Member: Would it not be well to state to this Association what has been done in Chicago relative to this disinfecting of cars?

DR. MARSHALL: Yes; go ahead and tell them about it.

A Member: The Medical Board and the State Livestock Sanitary Board have formulated a resolution relative to the disinfecting of cars; this has been adopted by the Eastern Livestock Sanitary Association, and will next month be presented to the National Livestock Sanitary Association which meets next month at Chicago. This will cover disinfecting cars against cholera and glanders, as well as the other transmissable diseases.

The PRESIDENT: Is there not something now in effect on this?

A Member: Only where the disease is known to be present.

MR. HARTSHORNE: One of the worst cases of cholera in the state of New York came through a car in which cattle had been shipped.

The PRESIDENT: I want to bring out one point in this discussion. Livestock is cash. Ship a car of livestock to any part of the country, and you get the cash, and go home with it. Now take a carload of cattle in Europe, and they are not paid for until they have passed the inspector on the butcher floor, and then they will not be paid for if they are diseased. Now, unless we make every effort to stamp out disease from our herds, we will come to the same thing here. What the result will be—well, it reminds me of what the college professor said when one of the pretty girl students asked him what would happen when an irresistable force met an immovable body. The professor said he didn't know exactly, but there would be a h—— of a time. Now, when you are thinking of the possibilities of this, think of the fact that after a hundred years of trying to fight this disease,

the British Government decided that slaughter is the only remedy. And not only do they slaughter the animals, but they burn the wooden buildings that contain the disease, and not only do they slaughter the animals that are diseased, but they slaughter the herd. Two years ago at the International Show they slaughtered a fine herd that came across on the same boat with an infected herd. Now, they are more strict than we are, as the result of a hundred of experience in trying to stamp out the disease. Now, I do think, in view of all this, that there is no more to be said.

MR. REINHOLD: According to our laws at the present time, if a breeder sells an animal for fat that is not fat, it will come back to him inasmuch as we have the Butchers' Indemnity Law. If a cow, when she comes to the floor is found to benefit for slaughter, the butcher can come back on the farmer for selling him an animal that is unfit for use. I may be wrong, but I have talked considerably on the subject.

I want to say that I am heartily in favor of what the President has said regarding the State Livestock Sanitary Board.

In regard to disinfecting the cars, I would also say that I think the State Livestock Sanitary Board, or some one with authority, should also exercise the same care in the small stockyards where there is a car unloaded every week or two, as they do in the larger ones. You will find these small yards in a deplorable condition, and something may arise from it. I think this should be looked after.

MR. DE VANE: I should like to know whether the Federal Government or the State Livestock Sanitary Board has some one looking after the disinfecting of the cars as an inspector.

DR. MARSHALL: Yes.

MR. DE VANE: Well, I know of one case where half a dozen men were detailed to do this work, and one was left to watch, while the other five went out to have a good time.

The PRESIDENT: Whenever you find any derelict on the part of the State or Federal Government, you should report it gently, but firmly.

DR. MARSHALL: We shall be very glad to have you telegraph us at our own expense, cases of any dereliction.

MR. DE VANE: In another case I wanted to ship a carload of cattle, and I asked the railroad for a nice, clean car; I noticed one on the siding that had been freshly cleaned, but the agent said he could not give it to me, but he would give me a disinfected car. There was a great deal of "Pinkeye" around at that time. I got a car, but it was very plain that it had not been disinfected, and the result was that my cattle got the disease. Now this agent was a nice man, and I didn't like to say anything, but I know of a great many cases like that.

MR. LANTZ: The Sheep Breeders are to meet this afternoon to organize. How many sheep breeders in the house?

The PRESIDENT: All the organizations that have elected officers, will please make their reports, so that the officers may be entered on the record.

The Pennsylvania Holstein-Friesian Association reported that they had re-elected the old officers, as did the Plant Breeders. The Pennsylvania Jersey Breeders' Association elected Hon. W. C. Norton, of Dalton, as President, and Mr. A. K. Heath, of Paoli, as Secretary and Treasurer.

MR. STEVENSON: There is another disease that is dreaded by the Breeders of Pennsylvania, and that is the dog disease. The Shropshire Association, as well as certain other organizations, are trying to get a uniform law passed on this subject. It is known that dogs carry hog cholera, and it is a detriment to the livestock interest to let them run at large. I want to make a motion that we endorse any action of the Shropshire Association on this subject.

This motion was properly seconded and duly carried in the regular way.

MR. MUNCE: I think the State Board of Agriculture has also adopted an endorsement along this line.

The PRESIDENT: If there is no further business the next in order is to adjourn; but before we do so, have all you fellows paid your dues? If not, see that you do so before you get out of here. I guess that's all. We stand adjourned.

OFFICERS OF THE PENNSYLVANIA JERSEY BREEDERS' ASSOCIATION.

President, W. C. Norton, Dalton, Pa.
Sec'y. & Treas., A. K. Heath, Paoli, Pa.

OFFICERS, OF THE PENNSYLVANIA BERKSHIRE BREEDERS' ASSOCIATION.

President, Henry Fielden, Newton Square.
Vice Presidents, George T. Van Norman, Langhorne; Dr. Vallie Hawkins, Fawn Grove.
Sec'y & Treas., D. Buckley, Broadaxe.

Board of Trade Building, Harrisburg, Pa.
Thursday, January 28, 1915.

At a meeting of the Sheep Breeders of Pennsylvania, the following organization was effected:

On motion of Mr. J. F. Lantz, properly seconded and duly carried in the regular way, Mr. R. M. Munce was elected temporary chairman.

The following gentlemen were found to be present: R. M. Munce, Canonsburg; J. F. Lantz, Harrisburg; Fremont Bowman, Philadelphia; W. G. Black, Mercer; George Stevenson, Waverly.

On motion of Mr. Lantz, properly seconded and duly carried in the regular way, Mr. Munce was elected President, and Prof. Sever-

son of State College Secretary and Treasurer. Prof Severson had been present, but was obliged to leave before the organization was affected.

On motion of Mr. Lantz, properly seconded and duly carried in the regular way, the President was instructed to appoint an Executive Committee, to consist of five or more members, and to include the President and Secretary. The following gentlemen were named on the Executive Committee: R. M. Carrons, Washington; George Stevenson, Waverly; E. A. Weimer, Lebanon; G. R. Herd, Genesee; Fremont Bowman, Philadelphia; Franklin Smedley, Frankford; the President R. M. Munce, and the Secretary, Prof. Severson.

The following gentlemen were nominated for membership: G. R. Herd, Genesee; W. C. Black, Mercer; Fremont Bowman, City Farms, Philadelphia; George Stevenson, Waverly; J. F. Lantz, Harrisburg; J. M. Paxton, Canonsburg; Franklin Smedly, Frankford, Philadelphia; Samuel Evans, Frankford, Philadelphia; Drs. Ray and Devlin, Oakford; A. K. Heath, Paoli; R. M. Munce, Canonsburg; E. A. Weimar, Lebanon; R. M. Carrons, Washington; Prof. Severson, State College.

After effecting this organization, the Association adjourned to meet again at the call of the President.

PENNSYLVANIA BREEDERS' ASSOCIATION.

President, E. S. Bayard, Pittsburgh.
Secretary, George E. Stevenson, Waverly.
Treasurer, J. F. Lantz, Harrisburg.
Chairman Livestock Breeders' Department, Hon. W. C. Norton, Harisburg.
Chairman Plant Breeders' Department, Porf. C. F. Noll, State College.

STATE DAIRY UNION.

President, E. M. Bailey, Pittsburgh.
Vice President , W. R. Gorham, Muncy.
Secretary, C. W. Larson, State College.
Treasurer, W. E. Perham, Pleasant Mount.

PENNSYLVANIA STATE POULTRY SOCIETY.

President, Hon. Edgar A. Weimer, Lebanon.
First Vice President, W. Theo. Wittman, Allentown.
Second Vice President, Hon Geo. T. Weingartner, New Castle.
Secretary, J. D. Koons, Treichlers.
Treasurer, Chas. F. Rosenow, Norristown.

PENNSYLVANIA POULTRY BREEDERS' ASSOCIATION.

President, Frank McGrann, Lancaster.
Vice President Hon. Edgar A. Weimer, Lebanon.
Secretary, W. W. Deissler, Chestnut Hill.
Treasurer, Fred H. Cook, Beaver.